

PACY - 2005

**Physical Activity Levels
and Dietary Intake
of Children and Youth
In the Province of Nova Scotia – 2005**

Submitted to the Nova Scotia Department of Health Promotion and Protection
and the Nova Scotia Department of Education

Principal Investigator:

Phil Campagna, Ph.D.
School of Health and Human Performance
Dalhousie University
Halifax, Nova Scotia

Co-investigators:

Michelle Amero, B.Sc, PDt
Department of Health Promotion and Protection
Nova Scotia Government
Halifax, Nova Scotia

Michael Arthur, M.Sc.
Department of Health Promotion and Protection
Nova Scotia Government
Halifax, Nova Scotia

Matt Durant, Ph.D. (candidate), P.Dt.
School of Nutrition and Dietetics
Acadia University
Wolfville, Nova Scotia

Rene Murphy, Ph.D.
Department of Kinesiology
Acadia University
Wolfville, Nova Scotia

Jack Porter, Ph.D.
Cape Breton University
Sydney, Nova Scotia

Laurene Rehman, Ph.D.
School of Health and Human Performance
Dalhousie University
Halifax, Nova Scotia

Angela Thompson, Ph.D.
Department of Human Kinetics
St. Francis Xavier University
Antigonish, Nova Scotia

Laurie Wadsworth, Ph.D.
Human Nutrition
St. Francis Xavier University
Antigonish, Nova Scotia

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Nancy Campagna
Jessie-Lee Langille
Lindsay Richardson
Rhona Hanning
Pete Driezen
Clint MacDonald
Jenn Towes
Lindsay Hogsden

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Executive Summary

Physical inactivity and poor dietary behaviours in children, adolescents, and adults not only increases risk of chronic disease, but also reduces quality of life resulting in a significant burden to the health care system. Some specific diseases linked to poor diet and physical inactivity include cardiovascular disease, type 2 diabetes, hypertension, osteoporosis, and certain cancers. Modifiable risk factors for chronic disease, including obesity, physical inactivity and less healthy diets, are of increasing concern for Canadian children and adolescents. The prevalence of overweight and obesity in Canadian children and adolescents has increased dramatically since the early 1980s. Since overweight and obesity in adolescence often continues to adulthood and the consequences in terms of chronic disease and health complications are severe, emphasis must be directed to health promotion and early identification and management of modifiable risk factors.

Poor diet and physical inactivity, resulting in an energy imbalance (more calories consumed than expended), are the most important factors contributing to the increase in overweight and obesity. Thus the PACY 2005 study was designed to collect data on physical activity (using an objective measure; accelerometer), height, weight, and waist girth from approximately 2300 boys and girls in grades 3, 7, and 11 as well as dietary intake measures from 1469 boys and girls in grades 7 and 11 (using an on-line dietary questionnaire to gather information on 24 hour recall and food frequency data). Subjects were randomly selected from the six Sport and Recreation Regions (SRR) in the province of Nova Scotia. Questionnaires were also administered to the study participants as well as to their parents to gather information regarding the factors that influence their attitudes and behaviours to physical activity.

Physical activity analyses revealed that daily physical activity was greater in 2001 than 2005 for all grades and sexes, with boys exhibiting greater daily physical activity levels than girls. Additionally, in both sexes there was a significant decrease in physical activity levels from the previous grade. When compared to the recommended level of physical activity (60 minutes or more of moderate or greater activity on at least 5 days of the week), it was found that over 96% of both boys and girls in grade 3 attained this criteria. The percentage of grade 7s that reached the recommended level dropped to 45.3% for boys and 23.8% for girls, and in grade 11 only 9.7% of the boys and <1% of the girls were active enough to achieve the moderate physical activity recommendation. In grade 7 approximately 40% of the boys and 35% of the girls achieved 60 minutes or more of physical activity on 3 to 4 days of the week suggesting that a small increase in physical activity on 1 or 2 days of the week may significantly increase the percentage of youth that would meet the Nova Scotia physical activity guidelines. Unlike the grade 7 boys and girls, a large proportion of grade 11 participants achieved zero to 1 day a week of 60 or more minutes of physical activity at a moderate or greater intensity level (49.5% for boys and 78.4% for girls). At first glance it would seem that grade 11 boys and girls are extremely inactive, however, further analysis of the data shows that grade 11 boys and girls accumulate a substantial amount of light activity (313.9 and 305.0 minutes per day respectively).

In physical measurements of height, weight, waist circumference and age, it was found that there were no significant differences in age, weight, body mass index (BMI), or waist

circumference of grade 3 boys and girls but that the boys were significantly taller than the girls. In grade 7, there were no significant differences in age, height, weight, BMI or waist circumference between the boys and girls. The grade 11 boys were significantly taller, heavier, and had a larger waist circumference than the girls. There were no significant differences in age or BMI between the boys and girls in grade 11.

Using BMI to determine weight classification revealed that 47.1% of the grade 3 boys and 40.5% of the grade 3 girls were considered at risk of overweight or overweight. In grade 7, 40.3% of the boys and 30.3% of the girls were classified as at risk of overweight or overweight, and in grade 11, 30.7% of the boys and 30.2% of the girls were considered at risk of overweight or overweight. "At risk of overweight" included the subjects whose BMI was greater than the 85th but equal to or less than the 95th age- and sex-matched percentiles, and "overweight" was defined as having a BMI exceeding the 95th age- and sex-matched percentiles. When categorizing waist girth according to age- and sex-matched percentiles, it was found that only 11.4% of the boys and 12.9% of the girls in grade 3 were considered to have an "unhealthy" waist girth. In grade 7, 27.6% of the boys and 38.8% of the girls had a waist girth that was "at risk" or "unhealthy", and in grade 11, 24.6% of the boys and 34.4% of the girls were "at risk" or "unhealthy" considering their waist circumference.

Combining waist circumference measurements with BMI helps to clarify weight status (i.e., lean vs. fat). A combined "unhealthy" waist girth and overweight BMI would indicate the greatest health risk. Using these criteria, 21.0% of the grade 3 boys and 13.2% of the grade 3 girls have the greatest health risk (i.e., a combined "unhealthy" waist girth [i.e., > 90th age- and sex-matched percentiles] and overweight BMI [i.e., > 95th age- and sex-matched percentiles]). Similarly, 17.4% of the boys and 13.2% of the girls in grade 7 and 13.1% of the boys and 9.5% of the girls in grade 11 would be considered at the greatest health risk because of a combined "unhealthy" waist girth (i.e., > 95th age- and sex-matched percentile) and overweight BMI (i.e., > 95th age- and sex-matched percentile).

Comparing 2001 data with 2005 data reveals that fewer grade 3 (10.0%) and 7 (3.6%) boys were classified with a healthy weight in 2005. In contrast, the 2005 sample for grade 11 boys showed that 3.3% more were classified with a healthy weight compared to 2001. Girls in all 3 grades displayed the opposite trend with more girls in grades 3 (4.2%) and 7 (9.6%) classified with a healthy weight whereas 5.2% fewer were of a healthy weight in grade 11 in the 2005 sample.

To obtain specific information about regular physical activities, students were given a list of physical activities and asked to indicate in which they regularly participated. The top two activities were the same (regardless of sex or age): walking, and jogging/running. The third most popular activity, however, was different for the grade 7 and 11 girls than for the other students. For the grade 7 and 11 girls, basketball was the third most popular activity, but for the rest of the students biking was the third most frequently listed.

In order to understand what children/youth were doing before or after school, participants in all three grades were asked to indicate whether or not they participated in a list of activities. Interestingly students in each of the grades had similar participation patterns. Boys consistently indicated more active forms of participation before and after school. Specifically, boys reported playing outside alone, playing outside with friends, playing active games, and playing sports in youth groups more frequently than the girls. An exception to this, however, was the grade 7 girls who noted playing outside with friends and playing active games more often than the boys. The

girls also more frequently noted the sedentary activity of sitting and talking more often than the boys.

For grades 3, 7 and 11 students, the average number of days a week in which they took part in physical education was 2.45, 2.83, and 3.70 days/week respectively. However, only 37% of students in grade 11 and 93% in grade 7 reported taking physical education.

Very few students reported walking to school. For grade 3 students, most reported taking the bus and less than a third were driven by someone. A larger percentage of grade 7 students as compared to grade 3s were walking to school in good weather; however, this percentage reduced by half in poor weather. The majority of students, regardless of weather, reported taking the bus. Most who reported walking in good weather were driven by someone in poor weather, with those who were bussed largely unaffected by weather. For grade 11 students, the percentage who reported walking to school (regardless of weather) was similar to those of grade 3 students. Yet, once again, the majority were bussed to school. Approximately 6% drove themselves to school and the rest tended to be driven by someone.

Students in grades 3, 7, and 11 were asked what factors may prevent or restrict them from being physically active. The top three constraints for grade 3 students included cost, lack of equipment, and school work. For two of these factors, girls and boys significantly differed in their responses. Cost and lack of equipment were reported more frequently as a barrier for girls than boys. The top constraints for grade 7 and 11 students were school work, no one to go with, poor weather, and the cost of participating. Differences between boys and girls were found for several items as well. Girls in grades 7 and 11 more frequently identified a lack of co-participants, fear of going out at night, and boy friends as preventing them from participating more than the boys. Boys in both of these grades more frequently listed girl friends as restricting their participation than the girls. Grade 7 girls listed sweating too much and girls in grade 11 listed school work, a paid job, and smoking as restricting their involvement more often than the boys.

Students were asked to estimate the number of hours (1) watching television, (2) playing video or computer games, and (3) engaged on the internet outside of school. Overall, younger children spent less time in front of the “screen”, averaging 3.70 and 3.11 hours per day for grade 3 boys and girls respectively while in grade 7, average screen time had increased to 5.36 hours for boys and 4.78 hours for girls. Finally, in grade 11, boys and girls spent on average 6.29 and 5.51 hours per day, respectively, in front of a screen. Television was the most reported screen time for students in all grades. Overall, screen time increased substantially from 2001 to 2005.

The web-based nutrition survey identified that the students’ median intakes did not meet the Dietary Reference Intakes for fibre, folate or calcium. Over 90% of the students were identified as not consuming enough fibre to meet the Adequate Intake (AI) level, and over half of the students did not meet the Estimated Average Requirement (EAR) for folate or the Adequate Intake for calcium. Fewer grade 7 students met recommendations for fibre and folate compared to students in grade 11.

While boys consumed significantly more servings of Grain Products, Milk Products and Meat and Alternatives than girls, median intakes remained suboptimal. Among girls, median intakes of Grain Products, Vegetables and Fruits, Milk Products and Meat and Alternatives did not meet *Canada’s Food Guide to Healthy Eating (CFGHE)* recommended number of servings. Over half of the girls in this sample did not meet recommendations for any of the food groups, while only a slightly higher proportion of boys met the recommendations. In terms of comparisons by grade, students in grade 11 consumed significantly more Grain Products and

Meat and Alternatives compared to students in grade 7, but they were only slightly more likely to meet *CFGHE* minimum recommendations.

Increased energy intakes from the Other Foods Category, such as sweetened beverages, have been observed in U.S. adolescents and in Canadian youth. In the current study, about one quarter of the girls and one third of the boys reported daily consumption of pop drinks, while 53% of girls and 68% of boys said they drink pop at least once a week. In addition, boys were more likely than girls to report eating salty snacks, french fries and pizza, and foods purchased at restaurants other than fast food restaurants, vending machines, the school tuck shop or an arena snack bar and convenience stores. Grade 7 students were also more likely than grade 11 students to report frequent consumption of pop, salty snacks, french fries and candy or chocolate bars, although students in grade 11 were more likely to report eating foods prepared at a fast food restaurant. The high frequency of consumption of foods of high energy density is alarming, especially given the low intakes from the nutrient-rich food groups.

Some behaviours that appear to change over adolescence may contribute to problems of poor nutrition, for example the decline in breakfast consumption and the number of family meals eaten together. Girls were significantly more likely to report breakfast skipping and were less likely to report snack consumption than boys. Students in grade 11 also were more likely to report breakfast skipping, compared to students in grade 7. The reasons for skipping breakfast may, in part, relate to misguided efforts at weight control. Girls were also more likely to report their weight as being above average, that they were concerned their weight was too high and that they were eating less to lose weight. The grade 11 students in this sample were also more likely to describe their weight as above average and report that they were concerned their weight was too high. The percentage of students reporting that they ate dinner with at least 1 parent on 6 or more days of the week was 63%.

This study has contributed new information on the food behaviours of grade 7 and grade 11 students from Nova Scotia. The findings are consistent with patterns documented in Canadian and U.S. adolescents and support the need for interventions to promote healthy eating and physical activity in children and youth.

For children, school represents a key environment for promoting healthy lifestyles. The U.S. Institute of Medicine (2005) report on preventing childhood obesity recommended that schools work in concert with government, public health and other organizations to facilitate cross-cutting programs and community-wide efforts. These baseline data may serve as a benchmark for monitoring change in response to new obesity prevention initiatives. A recent Nova Scotia study found that students in schools with environmental supports for healthy eating had lower rates of overweight/obesity, healthier food intake and more physical activity than students in schools without such programs (Veugelers & Fitzgerald, 2005). The U.S. Institute of Medicine (2005) report on preventing childhood obesity recommended that schools work in concert with government, public health and other organizations to facilitate cross-cutting programs and community-wide efforts.

A number of general recommendations as well as specific ones for various settings have been developed based on the study findings; click the following link to view these [Recommendations](#).

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1.0 Introduction

There is overwhelming evidence that the weight and obesity of children has increased in almost all developed countries over recent years. In one study comparing Canadian children from the 1960s to the 1990s, the sum of five skinfolds (a measure of fatness) was greater in the children and adolescents of the 1990s even after controlling for maturational and size differences (Thompson et al., 2002). Over one-quarter of Canadian children from 2 to 17 years of age are considered either overweight or obese (Shields, 2005). Not only are children, on average, fatter today compared to a generation ago, but the prevalence of overweight and obesity in Canadian children has increased (Tremblay et al., 2002). Specifically, in children ages 7 to 13 years, the prevalence of obesity (BMI > 95th age- and sex-specific percentile) increased from 5 to 16.6% in boys and 5 to 14.6% in girls, while overweight (BMI > 85th and ≤ 95th age- and sex-specific percentiles) increased from 15 to 35.4% in boys and 15 to 29.2% in girls, from 1981 to 1997 (Tremblay & Willms, 2000). Obesity is attributed to an interaction between biological, behavioural and environmental factors such as physical activity levels, dietary intake, psychological factors, and social, physical and economic environments.

In addition to the self-esteem issues associated with overweight and obesity, there is a risk of obese children becoming obese adults. In fact, an obese child has a 40% chance of becoming an obese adult while an obese adolescent has a 70% chance of obesity tracking to their adult years (Guo et al., 1994). While obesity itself is not a chronic condition, it is a significant risk factor in four of the ten leading causes of death (coronary heart disease, type 2 diabetes, stroke, and cancer) in the United States and Canada (Farley & Cohen, 2001; Kiefer, 2002). It is estimated that 4,000 potential years of life are lost each year in Nova Scotia and up to 1,000 deaths occur unnecessarily due to obesity (Colman & Hayward, 2002).

There is no common agreement on the specific causes of overweight or obesity, however, physical inactivity and sedentary lifestyles may be primary risk factors. Such sedentary lifestyles and low levels of physical activity also contribute to increased health risks, even if the individual is not overweight. The most recent Physical Activity Monitor (2001), a random telephone survey of Canadians, reported that only 43% of Canadian children (ages 5-17) were sufficiently physically active (expending energy in physical activities to a total of at least eight kilocalories per kilogram body weight per day) for optimal growth and development (Craig et al., 2001). Results showed that girls were less physically active than boys and adolescents less physically active than children. Specifically, 44% of the girls and 53% of the boys from 5 to 12 years were considered sufficiently physically active for optimal health benefits. Only 30% of the girls and 40% of the boys from ages 13 to 17 years were considered sufficiently physically active for optimal health benefits. The results from PACY-2001, which included an objective assessment of physical activity from a random sample of 1653 children in grades 3, 7, and 11 across Nova Scotia, also demonstrated a lower level of physical activity in girls compared to boys and in adolescents compared to children (Campagna et al., 2002). In this study, 90.0% of the boys and 92.3% of the girls in grade 3 accumulated the recommended level of 60 minutes or more of moderate and/or vigorous physical activity on at least five or more days per week. However, among the grade 7 students, only 62.2% of the boys and 44.5% of the girls attained the recommended level of physical activity. The level of physical activity dropped dramatically by grade 11, with only 12.6% of the boys and 6.9% of the girls attaining the recommended level.

It has been suggested that obesity is an epidemic that must be addressed at the origin. In order to do this, there must be an understanding of the current levels of children's and adolescents' physical activity and dietary intake and the factors that influence these two primary components of the energy balance equation.

Ball & McCargar (2003) found that less healthy food behaviours in adolescence have the potential to exert strong negative consequences on future health, including increased risk of chronic diseases in later life. Research suggests that many Canadian children and adolescents are not consuming the recommended servings of Milk Products or Vegetables and Fruit outlined by *Canada's Food Guide to Healthy Eating*. Moreover, in excess of a fifth of energy intake comes from the Other Foods Category (CCHS Cycle 2.2, Garriguet, 2006). It has been suggested that omission of breakfast or consumption of inadequate breakfast may be a factor that contributes to dietary inadequacies (Cohen, Evers et al., 2003). As well, healthy eating patterns formed early in childhood may persist into adulthood (Dietz, 1998).

Until recently, little was known about the food intake and behaviours of Nova Scotia adolescents. Hanning and colleagues at the University of Waterloo developed a web-based survey for students from grades 6 to 11 which has been administered in Ontario and Alberta. This survey tool was utilized to evaluate students in grade 7 and 11 attending schools in Nova Scotia.

Better understanding of eating and food behaviour patterns in Nova Scotia adolescents and variables that influence these patterns will assist in the development and evaluation of a targeted strategy to address food choice behaviours and associated problems.

The purpose of this research was to objectively measure the physical activity levels of students in grades 3, 7, and 11, as well as to further identify the factors influencing these levels, and collecting and analyzing dietary behaviour and attitude data from students in grades 7 and 11.

Objectives of the Project

1. To objectively measure the physical activity levels of children and youth in Nova Scotia. Specifically,
 - identify the percentage of children and youth who meet the standard of 60 minutes of accumulated moderate or greater intensity of physical activity on most days (at least 5) of the week
2. To determine the usual food intakes of children and youth in Nova Scotia. Specifically,
 - to categorize food intake data from children and youth according to food groups (grain products, vegetables and fruit, milk products, meat and alternatives, and other foods category) of *Canada's Food Guide to Healthy Eating*
 - to identify the proportion of children and youth food intakes meeting the recommendations of *Canada's Food Guide to Healthy Eating*
 - to categorize the food intake data from children and youth according to the percentage of energy obtained from fat
 - to describe the quality of food choices of children and youth according to the directional statements of *Canada's Food Guide to Health Eating* (i.e., choose whole grain and enriched products more often; choose dark green and orange vegetables and orange fruit more often; choose lower-fat milk products more often; choose leaner meats, poultry and fish, as well as dried peas, beans and lentils more often)

3. To measure height, weight, and waist circumference in children and youth in Nova Scotia. Specifically,
 - to identify the percentage of children and youth in Nova Scotia who are at risk of overweight (BMI > 85th ≤ 95th age and gender matched percentiles) or overweight (BMI > 95th age and gender matched percentiles)
 - to compare the number of at risk for overweight and overweight children and adolescents in 2001 to the number of at risk for overweight and overweight children and adolescents in 2005.
4. To further elucidate the environmental, physiological, and psychosocial factors that influence healthy eating and physical activity of Nova Scotian children and youth.
5. To disseminate information (based on the research findings) to organizations, professionals, volunteers, and the general public that plan programs to promote physical activity and healthy eating for children and youth in Nova Scotia.
6. To disseminate the research findings provincially, nationally, and internationally regarding children and youth in Nova Scotia and their physical activity, dietary intake, BMI, and the factors influencing each of these.

The scientific merit and uniqueness of this research is that:

- Nova Scotia is the only province in Canada that has a random surveillance of objectively measured physical activity in children and youth (NOTE: CFLRI has recently collected pedometer data on children and youth across Canada). Further, the acquisition of a second surveillance of children and youth's physical activity simply does not exist elsewhere and can be used to address many questions that otherwise could not.
- Nova Scotia is also the first province to evaluate whether the Federal, Provincial and Territorial Minister's goal of reducing physical inactivity by 10% in children and youth has been met using objectively measured physical activity.
- No province in Canada has a random surveillance of dietary intake in children and youth or conducted a random surveillance of measured height and weight in children and youth.
- Data were collected randomly based upon the six Nova Scotia Sport and Recreation Regions (SRR), comparisons among the regions can be made for levels of physical activity, dietary intake, BMI, as well as their correlates. Regional comparisons are necessary for the physical activity data to evaluate the effectiveness (cost and otherwise) of different initiatives that were developed and implemented across the province. Regional comparison of dietary intake is also necessary simply based upon the differences in the availability and access to various products.
- Data were coded according to school board and District Health Authorities for regional comparisons. These data will be particularly useful for each school board and District Health Authority to assess the policies and programs currently in place.
- Research will provide an opportunity for collaboration between the government and researchers from Acadia University, Dalhousie University, Cape Breton University, and St. Francis Xavier University, such that external funds (i.e., CIHR, NSHRF, etc.) may be applied for to expand the current study's objectives.

2.0 Methods

2.1 Recruitment

Approximately 2300 students were randomly selected from randomly selected schools so that 60 boys and 60 girls were represented from each grade 3, 7, and 11 in each of the six Nova Scotia Sport and Recreation Regions (SRR). No more than 40 subjects were tested from any particular grade in one school. The Department of Education provided a list of all schools in the province from which schools were randomly selected from each of the six Sport and Recreation Regions in Nova Scotia. A request was made of the principals of these randomly selected schools for permission to (1) discuss the research project with the applicable grade of students, and (2) to use the school as the designated site to obtain anthropometric measurements, attach accelerometers to collect physical activity data, and collect on-line dietary data (grade 7 and 11 only). If a school chose not to participate in the study, an additional school was randomly selected. This sample size is based on an estimate of the probability of detecting a 5% significance level as determined in PACY-2001.

Table 2.1.1 presents the sample characteristics by regions for each grade. There were a total of 820 grade 3 students, 813 grade 7 students and 742 grade 11 students included in the PACY 2005 sample. Chi-square analysis revealed no differences in the numbers of students sampled per grade level from each of the six SRRs.

Table 2.1.1: Number of students sampled by grade and Sport and Recreation Region (SRR)

Sport and Recreation Region	Number of students per grade		
	Grade 3	Grade 7	Grade 11
Cape Breton	145	149	121
Highland	140	146	134
Fundy	133	114	114
Valley	130	131	134
South Shore	144	144	115
Central	128	129	124
Total (province)	820***	813*	742**

* 18 subjects completed only the nutrition portion of the study

** 16 subjects completed only the nutrition portion of the study

*** no nutrition data was collected

2.1.1 Informed Consent

Once approval from the principals was granted, research assistants spoke to the students at the schools, preferably in smaller classroom settings, and distributed packets of letters of invitation and consent forms to be sent home with the students. Informed consent was obtained by the participant's parent or guardian, additionally verbal assent was obtained from the children and youth prior to any testing. In a small number of cases, the research assistants were unable to speak to all of the students in a particular grade due to the large number of students attending a particular school. In this situation, a number of English and Physically Active Lifestyles (PAL) classes were selected for the introduction and invitation to participate. English and PAL were chosen, as these are mandatory classes. As described in Table 2.1.2, a total of 7120 consent

packages were distributed, with 2772 returned for an average return rate of 38.2%. The return rates for grades 3, 7 and 11 were 63.4%, 38.8% and 25.4% respectively.

Table 2.1.2: Consent package return rates

	# of Consents Distributed	# of Consents Returned	% of Consents Returned
Grade 3	1515	960	63.4 %
Grade 7	2523	978	38.8 %
Grade 11	3082	784	25.4 %
TOTALS	7120	2722	38.2 %

Note: Not all subjects returning consent forms were selected for participation

2.1.2 Subject Participation

Randomly selected subjects from those who returned informed consent were asked to wear an accelerometer, have their height, weight, and waist circumference measured, complete an on-line dietary intake questionnaire (grades 7 and 11), and fill out a grade appropriate questionnaire. Data collection took place at the participants' school during most of the school year (October to June).

2.1.3 Data Collection Teams

- Dalhousie University: 1 male and 1 female physical education teacher seconded from the Department of Education.
- Acadia University: 1 male and 1 female physical education teacher seconded from the Department of Education.
- St. Francis Xavier University: 1 male physical education teacher seconded from the Department of Education and 1 recently graduated university female student.
- Cape Breton University: 1 female physical education teacher seconded from the Department of Education.

2.1.4 Confidentiality and Anonymity

The parent and child's names were assigned a code number. A list of names and matching codes is stored in the project research office at the School of Health and Human Performance at Dalhousie University. Only the researchers had access to the list. The physical activity data, dietary data and data analyses results are reported, presented or published without identifying individual children or parents. All data are stored in locked file cabinets for a minimum of five years after the completion of the research project in the Exercise Science Laboratory at Dalhousie University.

2.1.5 Financial Incentives

Each participating school was given \$250 to be used for physical education equipment purchases, physical activity or healthy eating related events. The incentive for student participation was an opportunity to win a \$100 gift certificate to a sports store in each of the six Sport and Recreation Regions for each of the three grades.

2.2 Physical Activity

Actigraph GT1M accelerometers were used to measure physical activity. In brief, the accelerometer is designed to detect vertical accelerations ranging in magnitude from 0.05 to 2.00 Gs with a frequency response of 0.25 to 2.50 hertz. These parameters allow for the measurement of normal human motion with the rejection of high frequency vibrations from other sources. The accelerations are filtered and digitized with the magnitude summed over a user specific interval of time. At the end of each interval, the summed value or activity “count” is stored in memory and the numerical integrator reset.

It is important to use the same measurement tool as was used in PACY-2001 so that comparisons between this study and the previous study, as well as other studies using the same tool, can be undertaken. The Actigraph (formerly MTI) accelerometer continues to be considered a valid and reliable tool for assessing physical activity in children and youth (Eisenmann et al., 2004; Puyau et al., 2002).

The accelerometer was placed on the right hip of each participant at the beginning of the first day of data collection. The accelerometer was held firmly in place against the body in Velcro pouches with a waist strap to insure consistency and proper positioning. Since the accelerometer is small (3.8 x 3.7 x 1.8 cm), it does not interfere with activities of daily living and can be worn over or under the subjects’ clothes, based on their preference. The subjects were instructed to wear the activity monitor during all waking hours for seven consecutive days, with the exception of when showering or engaged in water activities (swimming, water sports, etc.). Previous research has shown that a seven-day data collection period provides reliable estimates of usual physical activity patterns in children and youth (Trost et al., 2000). Subjects were instructed to record physical activities in a provided activity log while not wearing the accelerometer as well as when they were cycling since concern has been expressed about the accurate assessment of cycling.

As in the previous PACY 2001 project, the accelerometer data was reduced to one-minute counts and categorized into one of four physical activity intensities. Physical activity intensity was measured according to the metabolic equivalent (MET) used where 1 MET refers to resting energy expenditure (i.e., 3.5 ml/kg/min). As such, the age specific physical activity counts were categorized into light (> 1.0 < 3 METs), moderate (3-5.9 METs), hard (6-8.9 METs) or very hard (≥ 9 METs) physical activity using the following equation (Freedson et al., 1997):
$$\text{METs} = 2.757 + (0.0015 \times \text{counts/min}) - (0.08957 \times \text{age [yrs]}) - (0.000038 \times \text{counts/min} \times \text{age [yrs]})$$

2.2.1 Data Reduction

In order to be considered a useful complete sample for the analysis, each physical activity file had to contain at least five full days of physical activity with one of them being a weekend day. Any day containing more than 20 hours without physical activity was not considered a full sample day and excluded from the analysis. Table 2.2.1 describes the total numbers of subjects tested in each grade and the number of samples used in the physical activity analyses, as well as the various reasons for exclusion.

Table 2.2.1: Physical activity analysis sample size

	# of Subjects Tested	# Used in PA Analysis	% Used in PA Analysis
Grade 3	820	646*	78.8 %
Grade 7	795	610**	76.7 %
Grade 11	726	534***	73.6 %
TOTALS	2341	1790	76.5 %

* 23 malfunctions, 3 lost, 148 not worn long enough (75 of which had no weekend day)

** 32 malfunctions, 4 lost, 148 not worn long enough (58 of which had no weekend day), 1 withdrew

*** 15 malfunctions, 4 lost, 172 not worn long enough (71 of which had no weekend day), 1 withdrew

2.3 Anthropometric Data

Height, weight, and waist circumference were measured according to the International Society for the Advancement of Kinanthropometry (ISAK) standards for anthropometric assessments (ISAK, 2001). Height was measured as stretched stature and recorded to the nearest 0.1 centimetre. Weight was measured on a calibrated scale and recorded to the nearest 0.1 kilogram. Waist circumference was measured using an anthropometric measuring tape and measured to the nearest millimetre. This measurement was taken at the end of normal expiration at the narrowest portion of the torso. Measurements were taken by the same sex research team member to reduce possible discomfort of the subject. Further, participants were not able to see their height, weight, or waist circumference values.

Since there are strong associations between waist circumference and risk factors for coronary heart disease in children (Maffeis et al., 2001) and because of the inability of Body Mass Index (BMI) to differentiate lean and fat weight, waist circumference percentiles have been developed to assist in determining if children are at health risk. The cut-off points for the grade 3 boys and girls were obtained from Fernández et al, (2004) and for the grade 7 and 11 participants from Katzmarzyk (2004). Two sets of criteria were used because the Canadian data (i.e., Katzmarzyk, 2004) only included a sample that ranged from 11 to 18 years. For the grade 3 students, two categorizations were made: waist girths equal to or below the 90th age- and sex-matched percentile (i.e., a “healthy” waist girth) and waist girths greater than the 90th age- and sex-matched percentile (i.e., an “unhealthy” waist girth). For the grade 7 and 11 students, there were four categories or cut off points including waist girths less than the 5th age- and sex-matched percentile. A “healthy” waist girth was equal to or greater than the 5th and equal to or less than the 90th age- and sex-matched percentiles. An “at risk” waist circumference was greater than the 90th and less than or equal to the 95th age- and sex-matched percentiles. An “unhealthy” waist circumference was greater than the 95th age- and sex-matched percentiles.

BMI was calculated ($\text{mass [kg]} \div \text{height [m]}^2$) and the subjects categorized into groups (underweight, normal weight, at risk of overweight, overweight) using the Centers for Disease Control and Prevention (CDC) age- and sex-matched criteria (CDC, 2002) and the following cut-off points which may indicate health risk (Kuczarski et al., 2000). “Underweight” was defined as having a BMI less than the 5th age- and sex-matched percentile. “Normal weight” included boys and girls whose BMI was equal to or greater than the 5th and equal to or less than the 85th age- and sex-matched percentiles. “At risk of overweight” included the subjects whose BMI was greater than the 85th but equal to or less than the 95th age- and sex-matched percentiles. “Overweight” was defined as having a BMI exceeding the 95th age- and sex-matched percentile. It should be noted that the terms “at risk of overweight” and “overweight” were chosen to limit the negative connotations associated with the term “obesity” (Barlow & Dietz, 1998). Although these cut off points have been questioned in regards to international applicability (Cole et al., 2004), they have been recommended for use in Canadian children in a collaborative statement from Dietitians of Canada, Canadian Paediatric Society, The College of Family Physicians of Canada, and Community Health Nurses Association of Canada (2004).

The total number of samples used in the anthropometric analyses was 813 grade 3s, 794 grade 7s and 723 grade 11s, as described in Table 3.2.1.

2.4 Social, Behavioural and Environmental Factors Influencing Physical Activity

Questionnaires were used to examine the environmental and psychosocial factors that may influence the physical activity and dietary intake attitudes and behaviours of children and youth. These questionnaires were given to the students and their parents at the same time the letters of invitation and consent forms were distributed (i.e., at the schools during the introduction to the study). There are two separate questionnaires for the children and youth. One was designed for children in grade 3 and the other for youth in grades 7 and 11. Different questionnaires are required to address comprehension, different school day activities and the proposed correlates of physical activity and dietary intake. Various check-list questions are used to ask about physical activities engaged in before, during, and after school, who encourages and is active with them, and ability to participate in physical activities. Included on these questionnaires are also a few questions in regards to media use. Specifically, students were asked to estimate the number of hours outside of school (1) watching television, (2) playing video or computer games, and (3) engaged on the internet. This data will allow the researchers to estimate time engaged in sedentary activities that involve a “screen”. Similar physical activity and sedentary activity questionnaires were used in PACY-2001, so comparison of data collected at the two different times points is possible. The parental questionnaire asks about education level, employment, socioeconomic status, parents role in their children’s physical activity, etc. Most parent surveys were completed by mothers. Specifically, mothers completed 84% of surveys for grade 3 and 7, and 71.9% for grade 11. A teacher questionnaire examined the physical activity during the school day. All questionnaires were assigned a code number to ensure confidentiality. Despite efforts to collect completed questionnaires from all subjects, some were not obtained. Tables 2.4.1 and 2.4.2 describe the number of completed student and parent questionnaires used in the subsequent data analyses.

Table 2.4.1: Student questionnaire return rate

	# of Subjects Tested	# of Student Questionnaires Completed	% of Student Questionnaires Completed
Grade 3	820	795	97.0 %
Grade 7	813	764	94.0 %
Grade 11	743	703	94.6 %
TOTALS	2376	2262	95.2 %

Table 2.4.2: Parent questionnaire return rate

	# of Subjects Tested	# of Parent Questionnaires Completed	% of Parent Questionnaires Completed
Grade 3	820	788	96.1 %
Grade 7	813	755	92.9 %
Grade 11	743	686	92.3 %
TOTALS	2376	2229	93.8 %

2.5 Dietary Intake (Grades 7 and 11)

Following standard oral and written instructions, students who wore the accelerometers in grades 7 and 11 also completed the on-line questionnaire in the presence of the research assistants or teacher. In this regard, students were able to ask questions as they arose and therefore more complete dietary data was obtained. It should be pointed out that in regards to confidentiality, the print on the computer was small and could not be easily read by anyone unless they were leaning over the student, which the research assistants/teacher ensured did not happen. Each student completed the questionnaire on his or her own (not with a group of friends) at one computer. If requested, the assistants helped the students to complete the forms by showing the student how to find a particular food item and then leave as the student entered the food and amount. As well, there was an on-line tutorial that students could complete with the research assistants prior to completing their own records, which required approximately five minutes. In the vast majority of cases the nutrition survey was completed either on the day the accelerometers were placed on the subject or on the day they were picked up from the school, 8 days later. The children were given a unique code that was completely anonymous. Since the survey was sent electronically, no copy was present or left in the school. The data were stored at the University of Waterloo and did not include any names so confidentiality is assured. The data were transferred to Dalhousie University only using the student's unique code.

2.5.1 Study Design

The nutrition portion of the study included data collected from the *Food Behaviour Questionnaire* which was developed at the University of Waterloo (Hanning et al., 2003; Minaker et al., 2006; Hanning et al., in press). This survey was designed to assess nutrient intake, and food behaviours of children and adolescents through the use of a 24-hour dietary recall, food frequency questionnaire, and other nutrition and food behaviour questions. The web-based survey offers several logistical and methodological advantages including (1) the ability to survey a large number of participants; (2) the incorporation of interactive elements to increase the likelihood of proper reporting; (3) enjoyment and ease for participants; and (4) direct data transfer which reduces data entry errors. For the current survey, a French language version was developed.

A number of approaches have been used to establish the validity and reliability of this tool. When compared with direct observation of the noon meal from the previous day, the survey produced 87% agreement in food items selected (n=15, grade 9-10). Compared with dietitian-administered food recall interviews for the same 24-hour period, there was good agreement for energy and key nutrient intakes [intraclass correlation coefficients (ICC) >0.65, n=51, grade 6-8]. Furthermore, test-retest reliability for the FFQ, completed 6.5 (\pm 5.1) days apart, produced strong overall percentage agreements, e.g., 79% for cola intake, 73% for intake of french fries, and 71% for candy intake (n=159, grade 9-10) (Hanning & Lambraki et al., 2003). In 2006, comparison of 24 hour dietary recalls between the web-based survey and dietitian administered 24 hour recall interviews in 204 Toronto grade 6 – 8 students demonstrated that energy and nutrient intakes were positively correlated (p<0.001). Although ICCs for energy (0.58) and nutrients (0.48 – 0.61) were slightly lower than in the earlier

validation work, this may reflect the school populations in which 30 to 61% of students spoke English as a second language. Nevertheless, this data supports the validity of the tool (McPherson, Hoelscher et al, 2000).

2.5.2 Demographic Data

Students were asked to provide demographic data including age, grade, sex, and self reported height (in either centimetres or inches), weight (in either pounds or kilograms) as well as weight and height self-perceptions as below average, average or above average. In addition, physical height and weight measurements were taken by a same sex research team member. For comparison purposes, BMI was calculated ($\text{mass [kg]} \div \text{height [m]}^2$) using both direct measurement data and self-reported data.

2.5.3 Twenty-four Hour Dietary Recall

Dietary intake data were collected using a 24-hour dietary recall within the on-line survey. Students were asked to provide a detailed description of their food intake during the previous day, including breakfast, lunch, dinner and “other times” or snacks. Data was not collected on weekend days. Students chose from approximately 800 foods to compile a list of foods eaten the previous day. Students were instructed to choose a food that was “close” to the one they ate in the event that they could not find the exact food they had eaten. Foods were listed alphabetically and within their food group to increase respondents’ ease of use.

The weight of one serving of each item contained in the food list was based on the visual and/or text description of the item’s size and/or weight. For example, if the web-based survey described one serving of milk as an eight ounce glass, the nutrient breakdown for milk corresponded to eight ounces of milk. ESHA Nutrient Software (Version 7.9) was used to compile a nutrient profile of each food item on the web-based survey using the Canadian Nutrient File 2001 database. This nutrient breakdown was subsequently used to analyze the 24-hour dietary recall data.

For single foods that fall into only one of the *CFGHE* food groups, the serving size definitions found on the Canadian Nutrient File 2005 (CNF) website were used to compute the number of servings. For combination foods, the food group definitions from the 2001b CNF were used to calculate the number of *CFGHE* food group servings. For example, a Caesar salad as described on the web survey is broken down into one Vegetable and Fruit serving and one serving from the Other Foods Category. Servings from the Other Foods Category were determined by serving size definitions of the 2001b CNF, as the 2005 CNF did not provide serving sizes for these food items.

2.5.4 Food Behaviours

Other aspects of the survey included questions on usual meal consumption, e.g., breakfast skipping, a description of where and with whom students had eaten on the previous day, frequency of purchasing meals and snacks prepared away from home, family influences on eating behaviours, including frequency of eating dinner with at least one parent, food sources,

involvement in preparation of food, consumption of selected foods, confidence to eat healthy foods and trusted sources of nutrition information.

2.5.5 Data Reduction

Data cut-points were established for total caloric intake (200 to 6,000 kcals) to control for unrealistically low or high records. In addition, a manual scan of students who selected approximately three times the maximum recommended number of servings per food group as specified by *Canada's Food Guide to Healthy Eating* was conducted. Students with dietary intakes that were unrealistic (e.g., went down the list of milk products and picked the first 20 foods) were excluded. Table 2.5.1 describes the sample size characteristics of the nutrition component of PACY-2005.

Table 2.5.1: Dietary analyses sample size

	# of Subjects Tested	# of Samples Used in Analysis	% of Samples Used in Analysis
Grade 7	804	773	96.1 %
Grade 11	711	696	97.9 %
TOTALS	1515	1469	97.0 %

2.6 Statistical Analysis

The first level of data analysis involved descriptive analyses. This was followed by comparative analyses to the data collected in PACY-2001, and comparative analyses between the six Sport and Recreation Regions (SSR).

2.6.1 Physical Activity Data

Descriptive statistics (means and standard deviations) were calculated for the physical activity data for total minutes of physical activity for boys and girls separately for each grade. Further percent calculations were used to determine the number of students that achieved the recommended level of physical activity – at least 60 minutes of moderate or more intense physical activity on most days (i.e., five or more) of the week. Again, this data was compared to the data collected in 2001 using a General Linear Model.

2.6.2 Anthropometric Data

Descriptive statistics (means and standard deviations) were also calculated for the anthropometric data (height, weight, waist circumference, BMI) for boys and girls separately for each grade. Student's *t*-tests were used to compare the anthropometric data from PACY-2001 and PACY-2005. One-way Analyses of Variance were used to examine the anthropometric data (age, height, weight, BMI and waist circumference) collected from each of the six SSR.

2.6.3 Questionnaire Data

Similar to PACY-2001, the questionnaire data was summarized primarily using frequencies with chi-square analyses to test for sex and regional differences in each grade. Descriptive statistics (means and standard deviations) were also calculated for screen time data and Analysis of Variance (ANOVA) was used to test for significant sex and regional differences.

2.6.4 Dietary Data

Analysis of the dietary data was made using the latest Canadian Nutrient File available. Data collected from the web-survey were analyzed using the SAS statistical software package Version 9.0 (SAS Institute, Inc, Cary, NC). Comparisons between nutrient or food group means were conducted via Students' *t*-tests. Comparisons between medians were performed using the non-parametric Wilcoxon-ranks sum test. Chi-square analyses were conducted on all categorical data (e.g., food behaviour). In this study, analyses were controlled for school cluster to prevent confounding by socioeconomic status. In addition, analyses were controlled for sex, grade and/or SRR effects, depending on the comparison. The alpha level accepted as significant was $p \leq 0.05$. The comparisons made in the nutrition portion of the study differ from the remainder of the data, in that the nutrition comparisons are between all boys (grades 7 and 11 combined) and all girls (grades 7 and 11 combined), and between all grade 7s (boys and girls combined) and all grade 11s (boys and girls combined).

3.0 Study Findings

3.1 Physical Activity

3.1.1 Physical Activity 2001 vs. 2005

Daily physical activity levels for boys and girls in 2001 and 2005 are shown in Figure 3.1.1. For all grades and sexes, daily physical activity was greater in 2001 than 2005 with boys exhibiting greater daily physical activity levels than girls. In both sexes there was a significant difference in physical activity levels from the previous grade ($p < 0.05$).

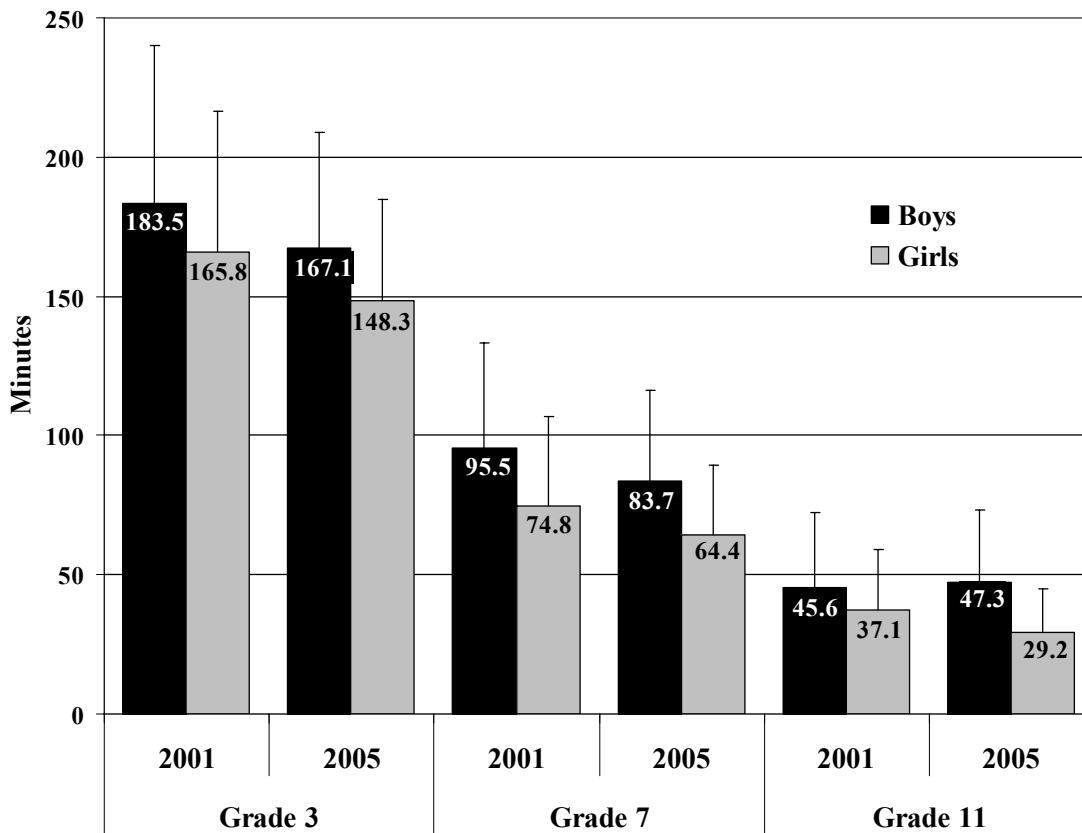


Figure 3.1.1: Means \pm standard deviation for daily moderate or greater physical activity by sex, grade and year

3.0 Study Findings

Note: The physical activity data is present in two ways: (1) average minutes of physical activity at moderate or greater intensity per day, and (2) the percentage of children and youth who met the Nova Scotia standard of 60 minutes of accumulated moderate or greater intensity of physical activity on most days (at least 5) of the week. It is important to note that for a subject to be considered physically active, they must meet the above standard on at least 5 days a week.

3.1.2 Grade 3

Physical activity levels for grade 3 boys and girls ranged from 54.7 to 290.5 minutes/day and 64.5 to 268.6 minutes/day, respectively. Ninety-six percent of grade 3 boys and 96.1% of grade 3 girls accumulated 60 minutes or more of physical activity on 5 or more days of the week (see Table 3.1.1). The percentage of boys and girls that achieved the recommended criteria of 60 minutes or more of moderate or greater physical activity was higher in 2005 than in 2001.

Table 3.1.1: Percentage and number (n) of grade 3 boys and girls that achieve 60 minutes or more of moderate or greater physical activity on most days of the week (5 or greater)

Sex	Grade 3	
	2001	2005
Boys	90.0% (289)	96.7% (309)
Girls	92.3% (287)	96.1% (337)

Regional Comparison

In comparing the average daily physical activity levels throughout the six Sport and Recreation Regions (SSR), grade 3 boys in the Valley region were significantly ($p < 0.05$) more physically active than grade 3 boys from the Fundy region (Figure 3.1.2), but no other differences existed in the regional comparisons.

In comparing the percentage of boys and girls that met the Nova Scotia standard there were no significant differences in the six SRR.

3.0 Study Findings

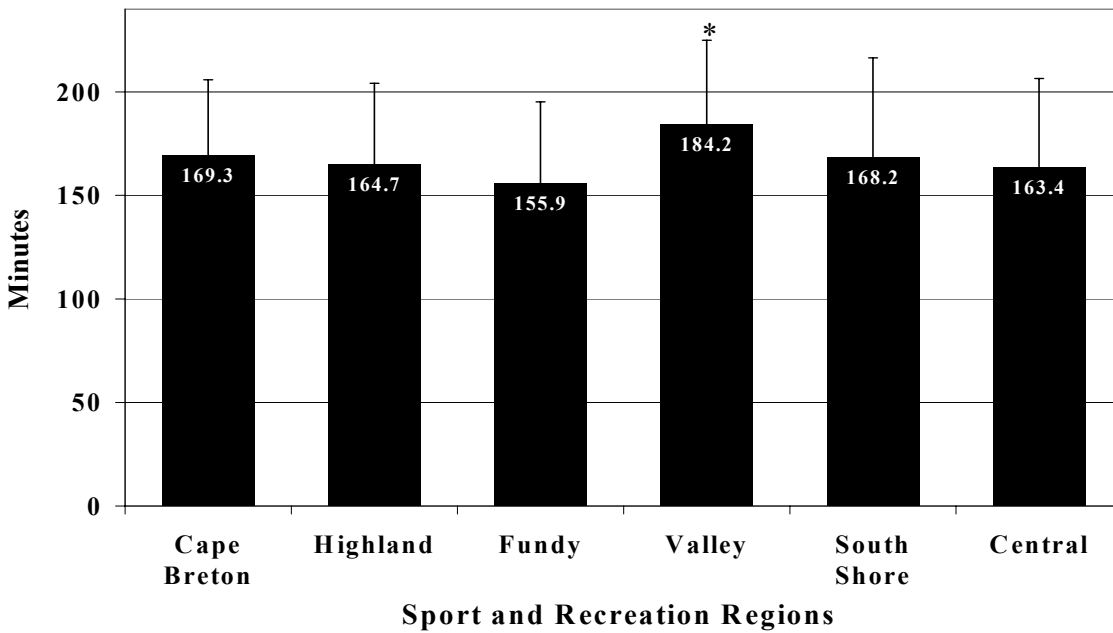


Figure 3.1.2: Physical activity levels (means \pm SD) of grade 3 boys in the six Sport and Recreation Regions (SRR)

* significant difference between Fundy and Valley SRR ($p < 0.05$)

There were no significant differences in average daily physical activity levels in grade 3 girls from the six SSR (Figure 3.1.3).

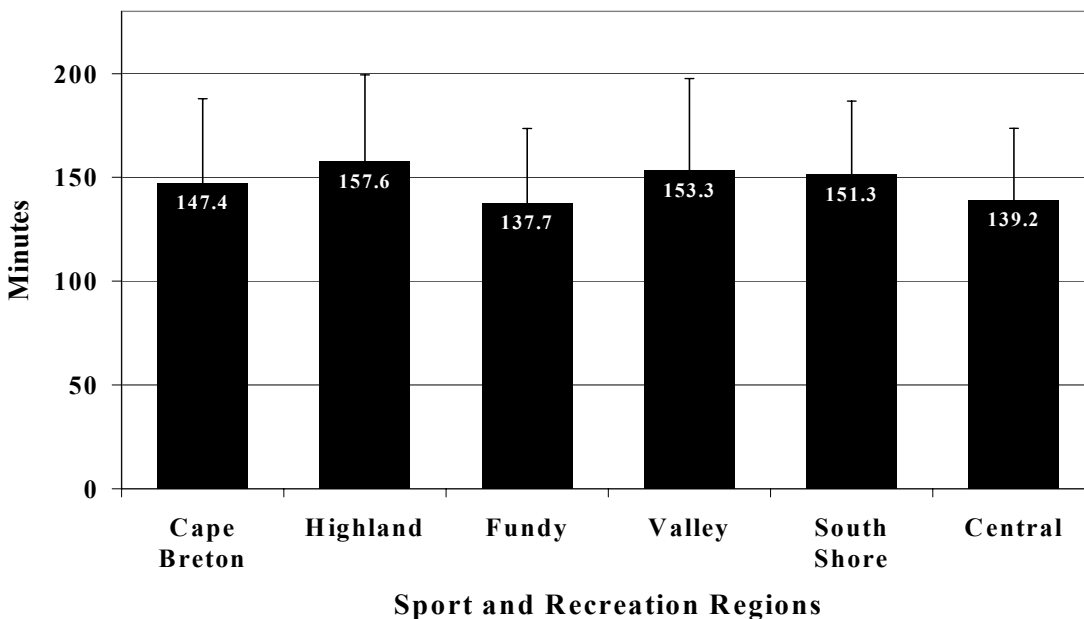


Figure 3.1.3: Physical activity levels (means \pm SD) of grade 3 girls in the six Sport and Recreation Regions (SRR)

3.1.3 Grade 7

The percentage of grade 7 boys in 2005 that accumulated 60 minutes or more of physical activity on 5 or more days of the week was significantly greater ($p < 0.05$) than the percentage of girls (45.3% vs. 23.8% respectively) (Table 3.1.2). Fewer of the grade 7 boys and girls were classified as achieving the required amount of physical activity in 2005 than 2001 (Table 3.1.2). Table 3.1.3 presents the percentage and number of boys and girls in grade 7 (2005) that achieved 60 minutes or more of moderate or greater physical activity on zero to seven days. Approximately 34% of the boys and 35% of the girls achieved 60 minutes or more of physical activity on three to four days of the week suggesting that a small increase in physical activity on one or two days of the week may significantly increase the percentage of youth that would meet the Nova Scotia guidelines.

Table 3.1.2: Percentage and number (n) of grade 7 boys and girls that achieve 60 minutes or more of moderate or greater physical activity on most days of the week (5 or greater)

Sex	Grade 7	
	2001	2005
Boys	62.2% (275)	45.3% (265)
Girls	44.5%* (283)	23.8%* (345)

* significant sex difference within grade ($p < 0.05$)

Table 3.1.3: Percentage and number (n) of grade 7 boys and girls that achieve 60 minutes or more of moderate or greater physical activity on zero to seven days a week

Days		0	1	2	3	4	5	6	7
Boys	%	1.9	6.4	12.5	16.2	17.7	16.6	17.7	10.9
	n = 265	5	17	33	43	47	44	47	29
Girls	%	9.3	16.5	15.4	18.0	17.1	11.0	9.3	3.5
	n = 345	32	57	53	62	59	38	32	12

Regional Comparison

In comparing the average daily physical activity levels throughout the six SRR, grade 7 boys in the Central and South Shore regions were significantly ($p < 0.05$) more physically active than grade 7 boys from the Highland region (Figure 3.1.4). There were no significant differences in average daily physical activity levels in grade 7 girls from the six SSR (Figure 3.1.5).

In comparing the percentage of boys and girls that met the Nova Scotia standard, the percentage of grade 7 boys in the South Shore region that met the criteria was significantly higher ($p < 0.05$) than boys in the Highland or Cape Breton Region. No other differences existed in any of the other regions for boys or girls.

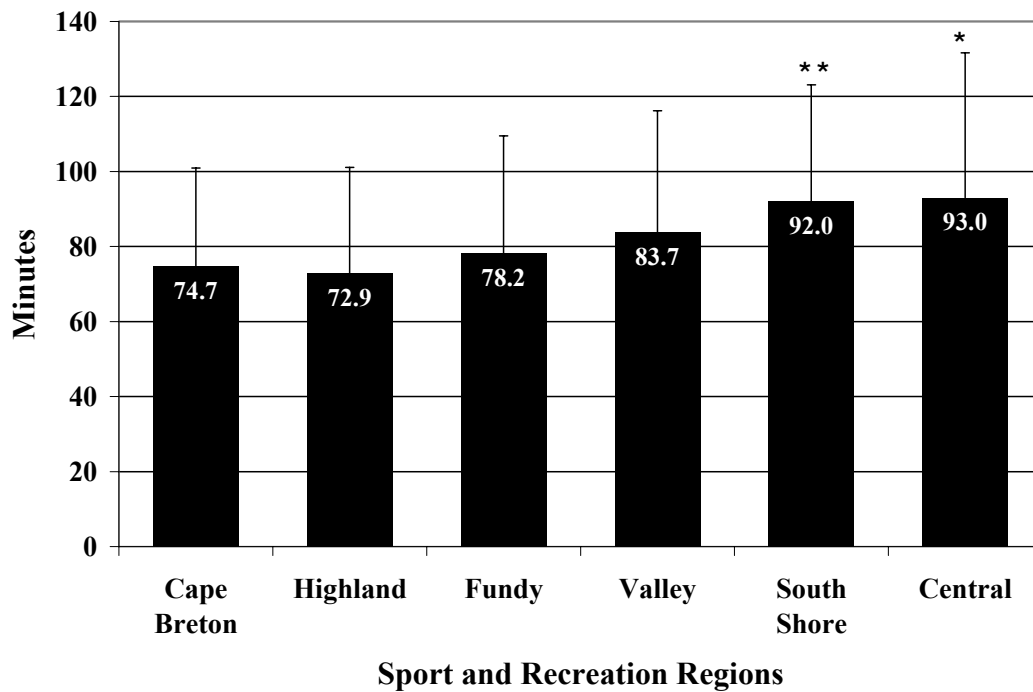


Figure 3.1.4: Physical activity levels (means \pm SD) of grade 7 boys in the six Sport and Recreation Regions (SRR)

* significant difference between Highland and Central SRR ($p < 0.05$)

** significant difference between Highland and South Shore SRR ($p < 0.05$)

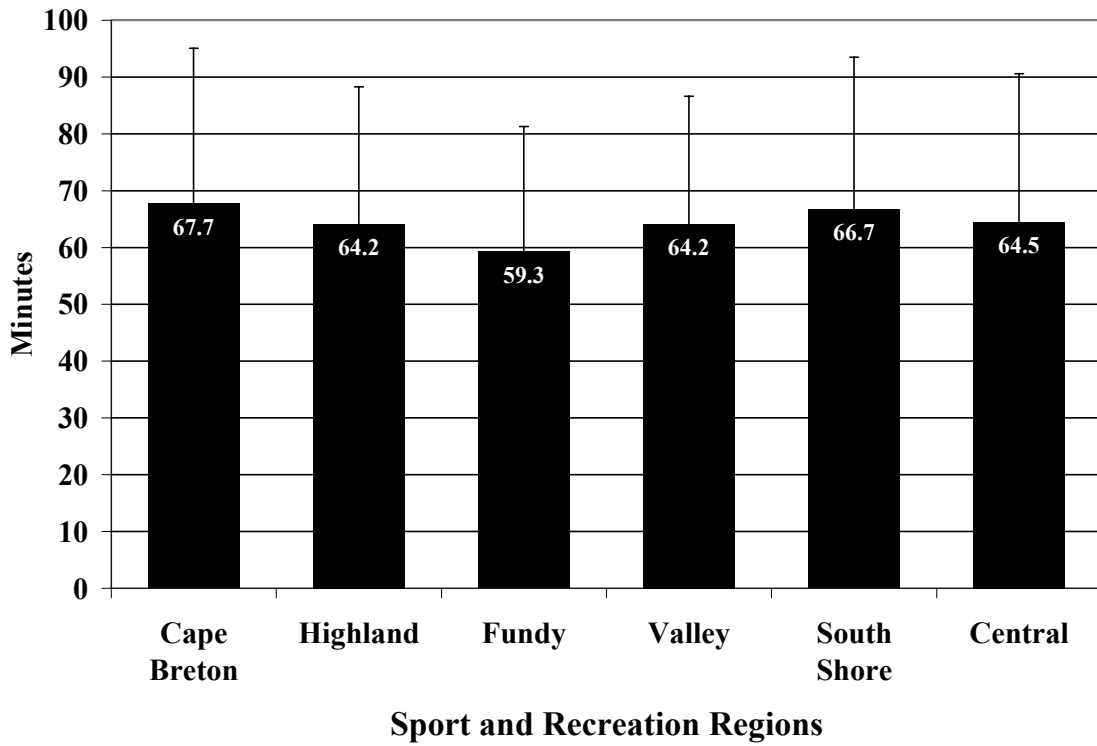


Figure 3.1.5: Physical activity levels (means \pm SD) of grade 7 girls in the six Sport and Recreation Regions (SRR)

3.1.4 Grade 11

The percentage of grade 11 boys in 2005 that accumulated 60 minutes or more of physical activity on 5 or more days of the week was significantly greater ($p < 0.05$) than the percentage of girls (9.7% vs. <1% respectively) (Table 3.1.4). Fewer of the grade 11 boys and girls were classified as achieving the required amount of physical activity in 2005 than 2001 (Table 3.1.4). Table 3.1.5 presents the percentage and number of boys and girls in grade 11 (2005) that achieved 60 minutes or more of moderate or greater physical activity on zero to seven days. Unlike the grade 7 boys and girls, a large proportion of grade 11 participants received zero to one day a week of 60 or more minutes of physical activity at a moderate or greater intensity level (49.5% for boys and 78.4% for girls). At first glance it would seem like grade 11 boys and girls are extremely inactive, however, further analysis of the data shows that grade 11 boys and girls accumulate a substantial amount of light activity (313.9 and 305.0 minutes respectively). With education and encouragement to minimally increase their intensity of physical activity (i.e. walking at approximately 5.5 kph pace) it is estimated that a substantial number of grade 11 participants may achieve the Nova Scotia criteria.

Table 3.1.4: Percentage and number (n) of grade 11 boys and girls that achieve 60 minutes or more of moderate or greater physical activity on most days of the week (5 or greater)

Sex	Grade 11	
	2001	2005
Boys	12.6% (228)	9.7% (228)
Girls	6.9%* (293)	<1%* (306)

* significant sex difference within grade ($p < 0.05$)

Table 3.1.5: Percentage and number (n) of grade 11 boys and girls that achieved 60 minutes or more of moderate or greater physical activity on zero to seven days a week

Days		0	1	2	3	4	5	6	7
Boys	%	28.1	21.5	18.4	14.0	8.3	3.9	3.1	2.6
	n = 228	64	49	42	32	9	9	7	6
Girls	%	57.2	21.2	13.7	4.9	2.6	0.3	0	0
	n = 306	175	65	42	15	8	1	0	0

3.0 Study Findings

Regional Comparison

In comparing the average daily physical activity levels throughout the six Sport and Recreation Regions (SRR), there were no significant differences in grade 11 boys (Figure 3.1.6). There was a significant difference in average daily physical activity levels in grade 11 girls from the Central region versus the other SRR (Figure 3.1.7).

In comparing the percentage of boys and girls that met the Nova Scotia standard there were no significant differences in the six SRR.

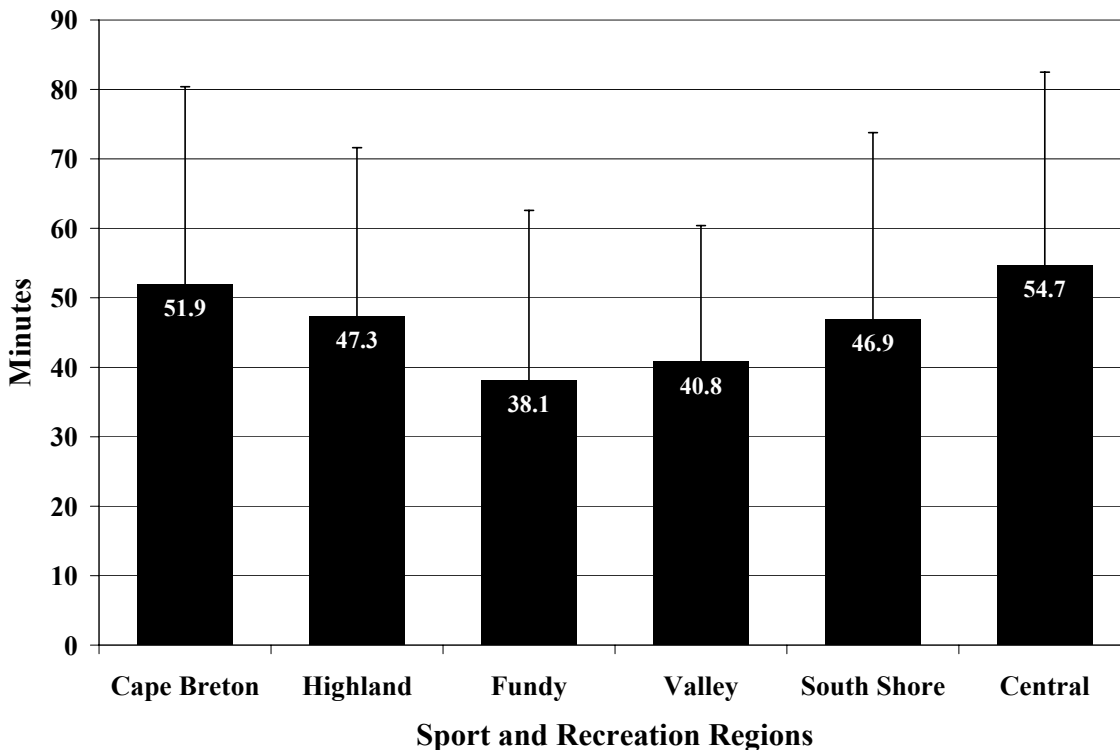


Figure 3.1.6: Physical activity levels (means \pm SD) of grade 11 boys in the six Sport and Recreation Regions (SRR)

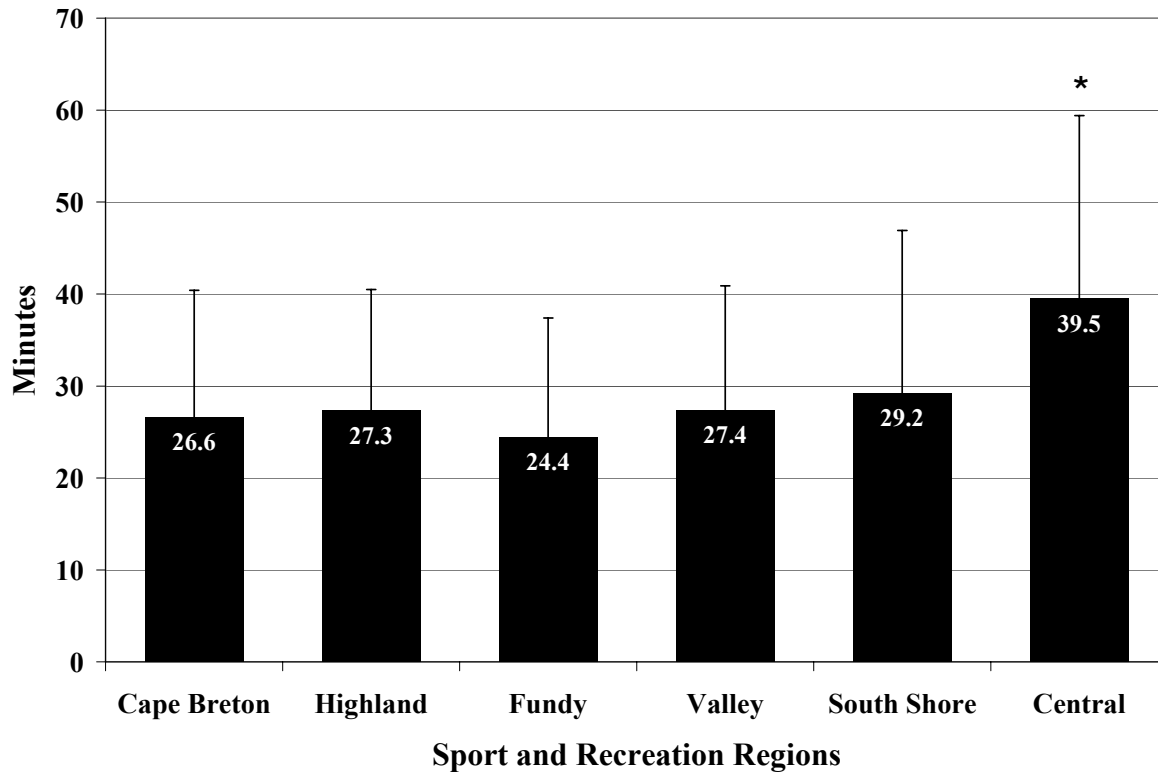


Figure 3.1.7: Physical activity levels (means \pm SD) of grade 11 girls in the six Sport and Recreation Regions (SRR)

* significant difference between Central and all Sport & Recreation Regions ($p < 0.05$)

3.1.5 Physical Activity Overview

Elementary age boys and girls are significantly more active than junior high or high school boys and girls. This trend was observed in the PACY-2001 study (Campagna et al. 2002) and is consistent with the results from a number of other studies (Kimm et al., 2000; Sallis, 2000; Telma and Yang, 1997). For all grades, boys were more physically active than girls; this has also been observed in a number of physical activity surveys (Fitness Canada, 1985; Stephens and Craig, 1990; Kann et al., 1998).

The recommended amount of physical activity in Nova Scotia has been established (Campagna and Maloney, 1999) to be a minimum of 60 minutes of moderate intensity on most days (five or more) of the week. This recommendation is consistent with the Health Education Authority in the United Kingdom (1998) and Strong et al. (2005). More than 96% of boys and girls in grade 3 achieved the above recommendation. Although the average amount of physical activity was greater than 60 minutes/day for grades 7 boys and girls (83.7 and 64.4 minutes/day, respectively), only 45.3% of the boys and 23.8% of the girls in grade 7 achieved the recommendation. Only 9.7% of the boys and <1% of the girls in grade 11 were active enough to achieve the moderate physical activity recommendation. It should be pointed out that in a small number of cases, subjects participating in a sporting event were required to remove the accelerometer by the referee or coach. Therefore, the percentage of grade 11s achieving the recommended amount of physical activity could be slightly higher than reported.

In a recent report Andersen et al. (2006) suggested that physical activity is important for metabolic health in children and that to prevent clustering of cardiovascular disease risk factors, the currently recommended guidelines of 60 minutes of moderate or greater intensity of physical activity may not be enough. They have suggested that 90 minutes of daily physical activity may be required to prevent the clustering of cardiovascular disease risk factors.

To increase the percentage of grade 7 and 11 students that achieve the recommended amount of physical activity – regardless of whether that recommendation is for 60 or 90 minutes of physical activity will require a well thought out strategy. Further, it will require a substantial change in attitude and behaviour from children and youth, their parents, community, schools and government.

3.2 Anthropometric Data

Table 3.2.1 presents the descriptive characteristics of the sample. The grade 3 boys were significantly taller than the girls. There were no significant differences in age, weight, body mass index (BMI), or waist circumference. In grade 7, there were no significant differences in age, height, weight, BMI or waist circumference between the boys and girls. The grade 11 boys were significantly taller, heavier, and had a larger waist circumference than the girls. There were no significant differences in age or BMI between the boys and girls in grade 11.

Using the weight classification criteria described in the methodology section, 47.0% of the grade 3 boys and 40.5% of the grade 3 girls were considered at risk of overweight or overweight. In grade 7, 40.3% of the boys and 30.3% of the girls were classified as at risk of overweight or overweight. In grade 11, 30.7% of the boys and 30.2% of the girls were considered at risk of overweight or overweight. Table 3.2.2 presents the weight classification (using BMI) of the sample.

Similar to Table 3.2.2, Table 3.2.3 presents data on the waist girth or waist circumference for the sample according to age-and sex-matched percentiles. Only 11.4% of the boys and 12.9% of the girls in grade 3 were considered to have an “unhealthy” waist girth. In grade 7, 27.6% of the boys and 38.8% of the girls had a waist girth that was “at risk” or “unhealthy”. In grade 11, 24.6% of the boys and 34.4% of the girls were “at risk” or “unhealthy” considering their waist circumference.

Table 3.2.4 presents results that combine weight status (i.e., BMI) and waist girth classifications. More specifically, the data presented in this table shows the percentage of boys and girls in grades 3, 7, and 11 who have combined “healthy” waist girths and “healthy” BMIs, or the various combinations of “at risk” or “unhealthy” waist girths and BMIs. Combining waist circumference measurements with BMI helps to clarify weight status (i.e., lean vs. fat). A combined “unhealthy” waist girth and overweight BMI would indicate the greatest health risk. Using these criteria, 21.0% of the grade 3 boys and 13.2% of the grade 3 girls have the greatest health risk (i.e., a combined “unhealthy” waist girth [i.e., > 90th age- and sex-matched percentile] and overweight BMI [i.e., > 95th age- and sex-matched percentile]). Similarly, 17.4% of the boys and 13.2% of the girls in grade 7 and 13.1% of the boys and 9.5% of the girls in grade 11 would be considered at the greatest health risk because of a combined “unhealthy” waist girth (i.e., > 95th age- and sex-matched percentile) and overweight BMI (i.e., > 95th age- and sex-matched percentile).

3.0 Study Findings

Table 3.2.1: Age, height, weight, BMI, and waist girth of grade 3, 7, and 11 boys and girls (\pm SD)

	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Number	395	418	362	432	313	410
Age (yrs)	8.3 \pm 0.49	8.3 \pm 0.49	12.4 \pm 0.52	12.4 \pm 0.50	16.5 \pm 0.66	16.6 \pm 0.59
Height (cm)	134.0 \pm 6.18	132.8 \pm 5.95	157.1 \pm 8.87	157.2 \pm 6.60	176.7 \pm 6.40	164.1 \pm 12.81
Weight (kg)	33.8 \pm 7.45	33.1 \pm 8.08	52.6 \pm 12.56	52.2 \pm 11.74	74.0 \pm 13.49	64.3 \pm 12.81
BMI	18.7 \pm 3.19	18.6 \pm 3.47	21.1 \pm 3.91	21.0 \pm 4.10	23.7 \pm 4.08	23.9 \pm 4.44
Waist Circumference (cm)	60.9 \pm 8.20	61.4 \pm 8.01	70.1 \pm 9.85	69.2 \pm 9.81	78.7 \pm 9.89	76.1 \pm 10.80

Table 3.2.2: Percentage and number (n) of grade 3, 7, and 11 boys and girls classified as underweight, normal weight, at risk of overweight, and overweight

	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Underweight BMI < 5 th age and sex-matched percentile	0.8% (3)	1.2% (5)	1.7% (6)	0.7% (3)	1.3% (4)	0
Normal Weight BMI \geq 5 th and \leq 85 th age and sex-matched percentile	52.2% (206)	58.4% (244)	58.0% (210)	69.0% (298)	68.1% (213)	69.8% (286)
At Risk of Overweight BMI > 85 th and \leq 95 th age and sex-matched percentile	21.5% (85)	20.6% (86)	21.8% (79)	17.1% (74)	16.6% (52)	20.2% (83)
Overweight BMI > 95 th age and sex-matched percentile	25.6% (101)	19.9% (83)	18.5% (67)	13.2% (57)	14.1% (44)	10.0% (41)

Table 3.2.3: Percentage and number (n) of grade 3, 7, and 11 boys and girls classified according to waist girth

	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Waist girth < 5th age and sex-matched percentile	N/A	N/A	4.7% (17)	0.7% (3)	3.5% (11)	1.0% (4)
Waist girth \geq 5th and \leq 90th age and sex-matched percentile	88.6% (350)	87.1% (364)	67.7% (245)	60.4% (261)	71.9% (225)	64.6% (265)
Waist girth > 90th and \leq 95th age and sex-matched percentile	11.4% (45)	12.9% (54)	5.5% (20)	11.3% (49)	5.1% (16)	12.0% (49)
Waist girth > 95th age and sex-matched percentile	N/A	N/A	22.1% (80)	27.5% (119)	19.5% (61)	22.4% (92)

3.0 Study Findings

Table 3.2.4: Percentage and number (n) of grade 3, 7, and 11 boys and girls classified according to waist girth and BMI

	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Waist girth < 5th age and sex-matched percentile, healthy BMI	N/A	N/A	3.0% (11)	0.2% (1)	2.6% (8)	0
Waist girth < 5th age and sex-matched percentile, at risk of overweight BMI	N/A	N/A	0.3% (1)	0	0	0
Healthy waist girth, underweight BMI	0.8% (3)	1.2% (5)	0.3% (1)	0.2% (1)	0.3% (1)	1.0% (4)
Healthy waist girth, healthy BMI	51.4% (203)	58.4% (244)	54.7% (198)	57.2% (247)	64.5% (202)	56.6% (232)
Healthy waist girth, at risk of overweight BMI	17.2% (68)	20.1% (84)	12.2% (44)	3.0% (13)	6.7% (21)	7.8% (32)
Healthy waist girth, overweight BMI	4.6% (18)	6.9% (29)	0.6% (2)	0	0.3% (1)	0.2% (1)
Waist girth > 90th and ≤ 95th age and sex-matched percentile, healthy BMI	0.8% (3)	0	0.3% (1)	6.7% (29)	1.0% (3)	8.0% (33)
Waist girth > 90th and ≤ 95th age and sex-matched percentile, at risk of overweight BMI	4.3% (17)	0.2% (1)	4.7% (17)	4.6% (20)	3.2% (10)	3.7% (15)
Waist girth > 90th and ≤ 95th age and sex-matched percentile, overweight BMI	21.0% (83)	13.2% (55)	0.6% (2)	0	0.6% (2)	0.2% (1)
Waist girth > 95th age and sex-matched percentile, healthy BMI	N/A	N/A	0	4.9% (21)	0	4.1% (17)
Waist girth > 95th age and sex-matched percentile, at risk of overweight BMI	N/A	N/A	4.7% (17)	9.5% (41)	6.7% (21)	8.8% (36)
Waist girth > 95th age and sex-matched percentile, overweight BMI	N/A	N/A	17.4% (63)	13.2% (57)	13.1% (41)	9.5% (39)

3.2.1 Comparisons 2001 - 2005

Table 3.2.5 presents anthropometric data from the PACY 2001 and 2005 samples. The sample size for 2005 exceeds that of the sample for 2001 in each grade and for boys and girls. Further the 2005 sample has more girls participating (1260 girls vs. 1070 boys; or 54.1% of the total sample).

Table 3.2.5: Age, height, and weight of the PACY 2001 and 2005 samples (\pm SD)

	Boys		Girls	
	2001	2005	2001	2005
Grade 3 Number	289	395	287	418
Age (yrs)	8.3 \pm 0.28	8.3 \pm 0.49	8.0 \pm 0.23	8.3 \pm 0.49
Height (cm)	132.8 \pm 6.86	134.0 \pm 6.18	131.4 \pm 7.13	132.8 \pm 5.95
Weight (kg)	32.4 \pm 8.20	33.8 \pm 7.45	32.4 \pm 8.19	33.1 \pm 8.08
Grade 7 Number	275	362	283	432
Age (yrs)	12.1 \pm 0.40	12.4 \pm 0.52	12.0 \pm 0.31	12.4 \pm 0.50
Height (cm)	156.8 \pm 8.42	157.1 \pm 8.87	155.5 \pm 10.45	157.2 \pm 6.60
Weight (kg)	52.5 \pm 14.55	52.6 \pm 12.56	52.6 \pm 12.61	52.2 \pm 11.74
Grade 11 Number	228	313	293	410
Age (yrs)	16.2 \pm 0.49	16.5 \pm 0.66	16.2 \pm 0.50	16.6 \pm 0.59
Height (cm)	175.6 \pm 6.98	176.7 \pm 6.40	165.0 \pm 6.43	164.1 \pm 6.00
Weight (kg)	73.7 \pm 17.29	74.0 \pm 13.49	66.7 \pm 24.04	64.3 \pm 12.81

3.0 Study Findings

Table 3.2.6 presents the weight classifications of boys and girls in grades 3, 7, and 11 of the PACY 2001 and 2005 samples. Fewer (10.0%) grade 3 boys were classified with a healthy weight in 2005. Similarly, 3.6% fewer boys in grade 7 were classified with a healthy weight. In the 2005 sample for grade 11, 3.3% more boys were classified with a healthy weight. More girls in grades 3 (4.2%) and 7 (9.6%) were classified with a normal weight whereas 5.2% fewer were of a healthy weight in grade 11 in the 2005 sample.

Table 3.2.6: Weight classification of the PACY 2001 and 2005 samples

	Boys		Girls	
	2001	2005	2001	2005
Grade 3				
Healthy Weight*	63.0%	53.0%	55.4%	59.6%
At Risk of Overweight**	17.6%	21.5%	24.7%	20.6%
Overweight***	19.4%	25.6%	19.9%	19.9%
Grade 7				
Healthy Weight	63.3%	59.7%	60.1%	69.7%
At Risk of Overweight	16.4%	21.8%	20.5%	17.1%
Overweight	20.4%	18.5%	19.4%	13.2%
Grade 11				
Healthy Weight	66.1%	69.4%	75.0%	69.8%
At Risk of Overweight	16.7%	16.6%	17.1%	20.2%
Overweight	16.2%	14.1%	7.9%	10.0%

* Healthy Weight = a BMI \leq 85th age- and sex-matched percentile.

** At Risk of Overweight = a BMI $>$ than the 85th but \leq 95th age- and sex-matched percentile

*** Overweight = a BMI $>$ than 95th age- and sex-matched percentile

3.2.2 Regional Comparisons

There were no significant ($p < 0.05$) differences in age, height, weight, BMI, or waist circumference in the grade 3 boys or girls between the 6 SRR.

In the girls in grade 7, the South Shore participants were older (12.56 ± 0.50 yrs) than the Highland (12.31 ± 0.47 yrs) and Valley (12.32 ± 0.47 yrs) participants. Further, the girls in the Highland region had a greater waist circumference (73.4 ± 11.5 cm) than the girls in the Cape Breton (67.4 ± 8.5 cm), Valley (67.0 ± 8.6 cm), and Central (68.5 ± 8.7 cm) regions. There were no other significant ($p < 0.05$) differences in height, weight, or BMI in the grade 7 girls. There were no significant ($p < 0.05$) differences in age, height, weight, BMI, or waist circumference in the grade 7 boys.

In the grade 11 girls, the Highland girls had a greater waist circumference (80.7 ± 8.7 cm) than the girls in the Cape Breton (73.3 ± 8.5 cm), South Shore (75.5 ± 11.0 cm), and Central (73.2 ± 11.3 cm) regions. Further, the girls in the Fundy region also had a greater waist circumference (80.7 ± 12.4 cm) than the girls in the Cape Breton, Valley (72.5 ± 9.5 cm), South Shore, and Central regions. There were no other significant ($p < 0.05$) differences in height, weight, or BMI in the grade 11 girls. In the grade 11 boys, the boys in the Highland region were taller (179.0 ± 5.7 cm) than the boys in the Central region (175.2 ± 7.3 cm). There were no other significant ($p < 0.05$) differences in age, weight, BMI, or waist circumference in the grade 11 boys.

3.3 Social, Behavioural and Environmental Factors Influencing Physical Activity

3.3.1 Physical Activity

Physical Activities before or after School

To obtain an understanding of what children/youth were doing before or after school, participants in all three grades were asked to indicate whether or not they participated in a list of activities (Table 3.3.1). Interestingly students in each of the grades had similar participation patterns. Boys consistently indicated more active forms of participation before and after school. Specifically, boys reported playing outside with friends, playing outside alone, playing active games, and playing sports in youth groups more frequently than the girls. An exception to this, however, was the grade 7 girls who noted playing outside with friends and playing active games more often than the boys. The girls also more frequently noted the sedentary activity of sitting and talking more often than the boys.

Table 3.3.1: Activities before or after school, percentage and number (n)

Things I did before or after school...	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Play outside with friends	91.3% (355)	87.2% (354)	80.9%* (279)*	72.1%* (302)*	60.3%* (184)*	45.1%* (179)*
Play outside alone	60.2%* (234)*	52%* (211)*	55.1%* (190)*	36.5%* (153)*	35.1%* (107)*	18.4%* (73)*
Play active games	33.9%* (132)*	18%* (73)*	62.6% (216)	55.1% (231)	52.8%* (161)*	31.5%* (125)*
Sit and talk with friends	55.3% (215)	59.9% (243)	60.6%* (209)*	73%* (306)*	74.8%* (228)*	83.4%* (331)*
Play sports in a club	27.2% (106)	23.4% (95)	21.4%* (74)*	33.7%* (141)*	21.3% (65)	19.6% (78)
Play team sports	44.2%* (172)*	23.4%* (95)*	52.5%* (181)*	44.2%* (185)*	42.6%* (130)*	35.3%* (140)*
Play sports in a youth group	19.5% (76)	25.9% (105)	18.9% (65)	15% (63)	12.8% (39)	7.3% (29)
Other activities	22.4% (89)	35.3% (149)	19.7% (73)	31.4% (139)	28% (89)	35.1% (149)

*Significant difference between boys and girls at $p < 0.05$

To obtain more specific information about regular physical activities, students were also given a list of physical activities and asked to indicate in which they regularly participated (Table 3.3.2). The top two activities were the same (regardless of sex or age): walking, and jogging/running. The third most popular activity, however, was different for the grade 7 and 11 girls than for the other students. For the grade 7 and 11 girls, basketball was the third most popular activity, but for the rest of the students biking was the third most frequently listed.

3.0 Study Findings

Table 3.3.2: Regular physical activities of students outside of school, percentage and number (n)

Which of the following physical activities do you do outside of school (weekdays and weekends)?	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Jogging/Running	62.2% (242)	64.8% (263)	67.5% (233)	73.7% (309)	59.5% (181)	60.2% (239)
Swimming	34.7%* (135)*	41.9%* (170)*	34.8% (120)	40.3% (169)	25.7% (78)	23.9% (95)
Biking	67.1% (261)	62.8% (255)	64.9%* (224)*	45.3%* (190)*	46.7%* (142)*	21.4%* (85)*
Softball/Baseball/ Hardball	19.8%* (77)*	13.8%* (56)*	20.9% (72)	16.5% (69)	22.4%* (68)*	14.1%* (56)*
Volleyball	4.9%* (19)*	9.4%* (38)*	13%* (45)*	29.4%* (123)*	8.2%* (25)*	15.6%* (62)*
Bowling	17.7% (69)	15.5% (63)	17.7% (61)	14.1% (59)	13.2% (40)	13.4% (53)
Basketball	33.7%* (131)*	23.2%* (94)*	58.6%* (202)*	47.3%* (198)*	38.8%* (118)*	29%* (115)*
Soccer	49.1%* (191)*	32.5%* (132)*	44.9% (155)	43% (180)	23.7% (72)	22.7% (90)
Skating	41.6% (162)	39.2% (159)	27.8% (96)	30.3% (127)	17.8% (54)	14.1% (56)
Martial Arts	7.7% (30)	6.2% (25)	7.5% (26)	5% (21)	9.2%* (28)*	3.5%* (14)*
Tai Chi	0.5% (2)	0.5% (2)	0.6% (2)	1% (4)	0.7% (2)	0.5% (2)
Walking	79.9%* (311)*	88.4%* (359)*	77.1%* (266)*	91.4%* (383)*	71.4%* (217)*	87.2%* (346)*
Football	14.9%* (58)*	2.5%* (10)*	27.2%* (94)*	6.7%* (28)*	21.4%* (65)*	5.8%* (23)*
Swings/Slides/ Teeter Totters	59.9%* (233)*	71.4%* (290)*	N/A	N/A	N/A	N/A
Tobogganing/ Coasting	28.5% (111)	31.8% (129)	28.4% (98)	23.4% (98)	9.2% (28)	8.8% (35)
Gymnastics	6.7%* (26)*	21.9%* (89)*	4.6%* (16)*	14.8%* (62)*	2.6%* (8)*	0.8%* (3)*
Hockey	43.4%* (169)*	12.3%* (50)*	44.9%* (155)*	16.5%* (69)*	33.9%* (103)*	8.1%* (32)*
Snowboarding	11.1%* (43)*	5.2%* (21)*	24.6%* (85)*	10%* (42)*	16.4%* (50)*	5.3%* (21)*
Racquetball/ Handball /Squash	3.3%* (13)*	0.7%* (3)*	7.0% (24)	7.9% (33)	5.6%* (17)*	1%* (4)*
Horseback Riding	2.8%* (11)*	9.9%* (40)*	3.8%* (13)*	13.4%* (56)*	2.6%* (8)*	8.1%* (32)*
Aerobics(Water/Step/Dance)	1.5%* (6)*	8.4%* (34)*	2%* (7)*	11.9%* (50)*	1.6%* (5)*	11.8%* (47)*

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Which of the following physical activities do you do outside of school (weekdays and weekends)?	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Dancing	8%* (31)*	42.4%* (172)*	7.2%* (25)*	41.8%* (175)*	9.5%* (29)*	29.5%* (117)*
Badminton	7.2% (28)	6.2% (25)	22.4% (82)	23.8% (94)	17.4% (53)	12.6% (50)
Weight Training	5.1%* (20)*	1.7%* (7)*	22.3%* (77)*	6.9%* (29)*	47%* (143)*	19.4%* (77)*
Rock Climbing	4.9% (19)	3.2% (13)	7.5% (26)	5.3% (22)	3.6%* (11)*	0.3%* (1)*
Scuba Diving	0.8% (3)	0% (0)	2.3% (8)	1.4% (6)	1% (3)	1% (4)
Fencing	1.3% (5)	0.2% (1)	1.2% (4)	0.7% (3)	2.3%* (7)*	0.3%* (1)*
Hiking	18.3% (71)	16.5% (67)	18.8% (65)	15.3% (64)	17.8% (54)	13.1% (52)
Tennis	3.6% (14)	3.4% (14)	10.1% (35)	11.9% (50)	5.6% (17)	4.3% (17)
Golf	8.5%* (33)*	4.2%* (17)*	16.2%* (56)*	8.1%* (34)*	16.8%* (51)*	1.5%* (6)*
Canoeing/Kayaking/Rowing	2.3% (9)	2.7% (11)	8.4% (29)	7.4% (31)	7.9% (24)	5.8% (23)
Waterskiing	0.5% (2)	1.2% (5)	2.6% (9)	2.1% (9)	2% (6)	0.8% (3)
Jumping Rope	15.7%* (61)*	61.3%* (249)*	10.7%* (37)*	36.8%* (154)*	4.6%* (14)*	14.1%* (56)*
Skateboarding	25.7%* (100)*	8.1%* (33)*	28.1%* (97)*	11.9%* (50)*	10.2%* (31)*	2.3%* (9)*
Rollerblading	17% (66)	20.9% (85)	17.4% (60)	20.5% (86)	10.2% (31)	6.8% (27)
Yoga	1.8% (7)	3% (12)	0* (0)	8.4%* (35)*	2.6%* (8)*	11.1%* (44)*
Snow skiing (Cross-Country/Downhill)	5.4% (21)	6.9% (28)	13.3% (46)	14.6% (61)	7.2% (22)	5.3% (21)
Snow-Shoeing	2.3% (9)	2.5% (10)	2.3% (8)	2.6% (11)	1% (3)	0.5% (2)
Wrestling	23.1%* (90)*	4.7%* (19)*	26.4%* (91)*	7.4%* (31)*	13.2%* (41)*	5.3%* (21)*
Exercise stationary bike, treadmill	11.3%* (44)*	17.7%* (72)*	33.6% (116)	32.2% (135)	26.3%* (80)*	35.8%* (142)*
Other	11.8% (47)	9.2% (39)	13.5% (50)	13.3% (59)	11.3% (36)	13.9% (59)

*Significant difference between boys and girls at $p < 0.05$

Physical Activities while at School

Students were asked to identify some of the physical activities they participated in while at school. For the grade 3 students, the most frequently listed activities included recess and free gym (Table 3.3.3). Very few students at this level were involved in clubs and there were no sex differences associated with participation. For grade 7 students, free gym was the most popular activity. Intramurals was the only significant difference between boys and girls, with boys participating more than girls. Grade 11 students reported lower overall participation in each of the physical activities at school than grade 3 and 7 students, with the exception of clubs. The most popular activity for boys was free gym, and school sports teams for girls. There were a large number of significant sex differences among grade 11 students. In particular, boys more frequently participated in free gym, and intramurals, while girls more frequently engaged in clubs and school sport teams.

Table 3.3.3: Physical activities participated in at school, percentage and number (n)

Do you participate in “...” at school?	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Free gym	55.5% (216)	50.7% (206)	53.6% (185)	51.1% (214)	40.2%* (123)*	24.9%* (99)*
Club	14.4% (56)	19.5% (79)	15.7% (54)	20% (84)	13.7%* (42)*	26.4%* (105)*
Recess	96.4% (375)	95.6% (388)	N/A	N/A	N/A	N/A
School sport teams	N/A	N/A	36.8% (127)	36.8% (154)	36.3% (111)	38.3% (152)
Intramurals	N/A	N/A	45.5%* (157)*	32.9%* (138)*	23.5%* (72)*	10.1%* (40)*
Other activities	27.6% (110)	28.2% (119)	28% (104)	26% (115)	24.2% (77)	26.8% (114)

*Significant difference between boys and girls at p<0.05

Physical Education Experiences

Students in each of the grades were asked questions about their experience with physical education at school. In particular, they were asked for likes, dislikes, and the number of days a week they had classes. For grade 3 students, the average number of days a week in which they took part in physical education was 2.45 (with a range from 1 to 5). These students reported a range of likes and dislikes during their classes. Some of the most frequently reported “likes” included: running, playing games, “everything”, and “it’s fun”. For dislikes, “nothing” was noted by 38.2%, along with “being hot and tired” and running.

For grade 7 students, the average number of days a week for physical education was 2.83 (with a range from 1 to 5). Fifty-seven students (7%) did not report taking physical education. Common likes for this group included: learning about sports and their rules, playing games, “it’s fun”, and being active. Concerns for the grade 7 students included: nothing (36%), running, “some of the sports”, and “playing weird games”.

For grade 11 students, the average number of days for physical education was 3.70 (with a range of 1 to 5); however, only 37% of students (n=274) reported taking physical education (with no sex differences among the group). Common likes included: sports, getting exercise,

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“it’s fun”, and games. Dislikes among this group included: nothing (9.4%), going in the classroom to take notes, games, getting sweaty, and when people don’t participate.

Travel to School during Good and Poor Weather

In the survey of parents, they were asked how children were transported to school in good and poor weather (Tables 3.3.4 and 3.3.5). Very few reported walking to school in any of the grades.

Table 3.3.4: Method of transportation to school in good weather, percentage and number (n)

Transportation to school in good weather	Grade 3	Grade 7	Grade 11
Take the bus	65.5% (537)	59.5% (484)	52.9% (393)
Walk	15.4% (126)	20% (163)	15.2% (113)
Driven by someone	14.8% (121)	12.1% (98)	16.0% (119)
Bike	0.1% (1)	0.9% (7)	0.7% (5)
Drive themselves	N/A	N/A	6.9% (51)

For grade 3 students, most reported taking the bus and less than a third were driven by someone. A larger percentage of grade 7 students as compared to grade 3s walked to school in good weather; however, this percentage was reduced by half in poor weather. The majority regardless of weather reported taking the bus. Most who reported walking in good weather were driven by someone in poor weather, with those who were bussed being largely unaffected by weather. For grade 11 students, the percentage who reported walking to school (regardless of weather) was similar to those of grade 3 students. Yet, once again, the majority were bussed to school. Approximately 6% drove themselves to school and the rest tended to be driven by someone.

Table 3.3.5: Method of transportation to school in poor weather, percentage and number (n)

Transportation to school in poor weather	Grade 3	Grade 7	Grade 11
Take the bus	62.6% (513)	56.8% (462)	52.8% (392)
Walk	6.5% (52)	10.2% (83)	7.3% (54)
Driven by someone	26.8% (220)	25.2% (205)	25.4% (189)
Bike	0	0	0.4% (3)
Drive themselves	N/A	N/A	5.7% (42)

3.3.2 Influences on Physical Activity

Constraints to Physical Activity

Students in grades 3, 7, and 11 were asked what factors may prevent or restrict them from engaging in physical activity. Specifically, the question read, “I would like to be physically active, but...” (Table 3.3.6). Grade 7 and 11 students were asked some additional items that were not included in the survey/questionnaire for the grade 3s (see the N/A in Table 3.3.6). The top three constraints for grade 3 students included cost, lack of equipment, and school work. For two of these factors, girls and boys significantly differed in their responses. Cost and lack of equipment were reported more frequently as a barrier for girls than boys.

Table 3.3.6: Constraints to physical activity, percentage and number (n)

I would like to be physically active but...	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
It is too expensive	16.5%* (64)*	24.1%* (98)*	22% (76)	24.3% (102)	20.4% (62)	26.7% (106)
I don't have any equipment	14.4%* (56)*	19.7%* (80)*	20.6% (71)	23.2% (97)	24.3% (75)	27.2% (108)
School work takes too much time	15.7% (61)	13.5% (55)	30.7% (106)	37% (155)	41.4%* (126)*	52.6%* (209)*
I don't have anyone to go with	13.1% (51)	15.5% (63)	24.3%* (84)*	37%* (155)*	30.3%* (92)*	39.5%* (157)*
It is too far away	12.3% (48)	15.8% (64)	22.3% (77)	23.9% (100)	24.3% (74)	27.7% (110)
The weather is bad	15.7% (61)	11.6% (47)	27.8% (96)	29.1% (122)	31.9% (97)	28% (111)
I don't have a place to do so	12.9% (50)	13.5% (55)	17.2% (56)	18.6% (78)	17.8% (54)	22.4% (89)
I am scared to go out at night	8.2% (32)	11.3% (46)	3.2%* (11)*	8.6%* (36)*	1%* (3)*	4.3%* (17)*
Sickness or injury stops me	5.1% (20)	4.9% (20)	21.2% (73)	22.4% (94)	18.8% (57)	24.2% (96)
I don't know how	3.9% (15)	4.4% (18)	7% (24)	9.3% (39)	4.6% (14)	7.3% (29)
I sweat too much	5.1% (20)	3% (12)	0.6%* (2)*	6%* (25)*	3.3% (10)	4.8% (19)
It is too risky or dangerous	4.9% (19)	3% (12)	9.6% (33)	9.5% (40)	3.3% (10)	4.3% (17)
I am not allowed	3.1% (12)	3.2% (13)	15.3% (41)	8.4% (64)	5.6% (17)	4.3% (17)
My parents don't encourage me	1.8% (7)	3.7% (15)	9.9% (34)	7.4% (31)	3.3% (10)	4% (16)
It is not fun anymore	2.3% (9)	2.0% (8)	6.7% (23)	9.3% (39)	7.9% (24)	7.3% (29)

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I would like to be physically active but...	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
I am not interested in physical activities	2.8% (11)	1.5% (6)	4.3% (15)	4.1% (17)	5.3% (16)	5% (20)
My girl friends prevent me	N/A	N/A	2.9%* (10)*	1.0%* (4)*	4.6%* (14)*	0*
My boy friends prevent me	N/A	N/A	0.3%* (1)*	2.4%* (10)*	0*	5.3%* (21)*
My friends prevent me	N/A	N/A	3.5%* (12)*	7.2%* (30)*	2.3% (7)	3.3% (13)
My job prevents me	N/A	N/A	2.0% (7)	1.2% (5)	20.7%* (63)*	28.7%* (114)*
Use of drugs or alcohol prevents me	N/A	N/A	0.3% (1)	0.5% (2)	1.6% (5)	1.8% (7)
Smoking prevents me	N/A	N/A	0	0.7% (3)	1.6% (5)	5.8%* (23)*

*A significant difference between boys and girls at $p < 0.05$

The top constraints for grade 7 and 11 students were school work, no one to go with, poor weather, and the cost of participating. Differences between boys and girls were found for several items as well. Girls in grades 7 and 11 more frequently identified a lack of co-participants, fear of going out at night, and boy friends as preventing them from participating. Boys in both of these grades more frequently listed girl friends as restricting their participation. There were also some different constraints identified by boys and girls in these two grades. Grade 7 girls listed sweating too much and girls in grade 11 listed school work, a paid job, and smoking as restricting their involvement more often than the boys.

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Self-efficacy

To explore the perceived self-efficacy of the students, participants were asked to reflect upon whether or not they felt they had control over a variety of situations. In particular, they were asked to consider whether they would be able to participate in physical activity if faced with a variety of factors. Students in grade 3 were simply asked to indicate yes/no responses (Table 3.3.7) while a measure of frequency was used for grade 7 and 11 students (Table 3.3.8).

Table 3.3.7: Self-efficacy to participate in physical activity by grade 3s, percentage and number (n)

I think I can...	Total	Boys	Girls
Be physically active most days after school	96.3% (751)	96.9% (370)	95.7% (381)
Be physically active no matter how good I am	95.6% (734)	95.2% (360)	95.9% (374)
Ask someone to take me to a physical activity	90.2% (700)	91.9% (350)	88.6% (350)
Be physically active even if I could watch TV	87.8% (677)	86.8% (328)	88.8% (349)
Be physically active even if I have a lot of homework	82.8% (644)	80.3% (306)	85.1% (338)
Be physically active no matter how tired I feel	82.5% (643)	83.9% (322)	81.3% (321)
Be physically active even if I could play video games	81.4% (625)	81.2% (307)	81.5% (318)
Be physically active even if I could use the computer	80.2% (621)	80.8% (307)	79.7% (314)
Ask someone for a ride	75.8% (579)	79.3%* (295)*	72.4% (284)*

*A significant difference between boys and girls at $p < 0.05$

Most of the grade 3 students felt they could be active and their skill level did not play a role in their participation. An interesting observation found was that although grade 3 students felt they could “ask someone to take them to a physical activity”; they also felt it was more challenging to actually “ask someone for a ride”. Ninety percent of students indicated they could ask someone to take them to a physical activity, but only seventy-five percent felt they could ask directly for a ride. There was also a sex difference in ability to ask for a ride, with boys indicating they were able to ask more frequently than girls.

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When examining grade 7 and 11 responses (Table 3.3.8), information reported was grouped by often/very often (as they were given a Likert-type scale with scores ranging from 1-5). Twenty to forty percent of grade 7 and 11 students felt they were able to participate (often/very often) in physical activity if faced with other options or challenges. Interestingly, the most frequently reported factor they felt that they could overcome was watching TV. This item was listed the most frequently by boys and girls in each of the grades.

Table 3.3.8: Self-efficacy to participate in physical activity by grade 7 and 11, students' responses grouped by often/very often, percentage and number (n)

I think I can...	Grade 7		Grade 11	
	Boys	Girls	Boys	Girls
Be physically active no matter how tired I feel	55.7%* (186)*	46%* (189)*	44% (132)	36.5% (144)
Be physically active even if I have a lot of homework	54% (181)	48.8% (199)	55.7%* (167)*	39.7%* (156)*
Ask someone to take me to a physical activity	53% (174)	51.9% (209)	53.0% (158)	53.8% (210)
Ask someone for a ride	42.2% (139)	50.1% (202)	51.5% (153)	52.7% (205)
Be physically active most days after school	72% (239)	71.1% (288)	63.1%* (188)*	54.8%* (215)*
Be physically active no matter how good I am	77.6% (256)	74.8% (299)	73.9%* (221)*	65.9%* (257)*
Even if I could watch TV	63% (208)	62.4% (251)	64% (192)	66% (258)
Even if I could play video games	59.7% (197)	59.5% (237)	58.9%* (176)*	61.7%* (240)*
Even if I could use the computer	60.5% (199)	57.9% (232)	44% (132)	36.5% (144)

*A significant difference between boys and girls at $p < 0.05$

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Perceived Effects of Participating in Physical Activity

Another question asked of the grade 7 and 11 students explored the potential effects they felt might be achieved from participating in physical activity. Participants were asked to indicate any of the effects they felt might be obtained (Table 3.3.9). The most frequently cited effects for both the grade 7 and 11 students were related to getting or keeping in shape, having fun, and feeling good about self. Differences between the boys and girls were found for each grade. In grade 7, girls more frequently listed looking good to others than the boys. Girls in grade 11 noted weight control, greater energy, greater pain and muscle soreness, and working out anger more than the boys did as potential effects of activity.

Table 3.3.9: Perception of the effects of physical activity on grade 7 and 11 students, percentage and number (n)

Participating in physical activity would...	Grade 7		Grade 11	
	Boys	Girls	Boys	Girls
Get or keep me in shape	98.2% (330)	98.1% (403)	98.7% (294)	99.5% (391)
Make me tired	51.7% (169)	46.6% (189)	43.4% (126)	45.3% (175)
Be fun	97.3% (328)	96.4% (396)	94.3% (279)	94.4% (369)
Be boring	9.3% (30)	8.7% (35)	10.5% (30)	10.5% (40)
Make me better in sports	96.1% (320)	93.9% (385)	88.2% (261)	86.7% (338)
Make me get hurt	25.7% (82)	20.6% (83)	24.6% (70)	26.2% (100)
Help me control my weight	80% (264)	80.6% (329)	81.6%* (239)*	88.7%* (345)*
Make me embarrassed in front of others	12% (38)	14.1% (57)	10.5% (30)	13.8% (53)
Give me energy	87% (288)	87.3% (357)	86%* (251)*	92.3%* (361)*
Cause pain and muscle soreness	44% (142)	47.9% (192)	55.1%* (161)*	63.1%* (243)*
Help me make new friends	81% (265)	80% (324)	74.7% (219)	71.5% (276)
Help me spend more time with friends	88% (293)	89.9% (364)	81% (239)	78.2% (302)
Help me look good to others	75.5%* (243)*	66.3%* (268)*	78.8% (227)	75.8% (294)
Help me work out anger	67.9% (220)	66.7% (269)	68%* (198)*	79.4%* (308)*
Help me feel good about myself	95.5% (315)	96.1% (392)	90.8%* (67)*	98.2%* (385)*

*Significant difference between the boys and girls at $p < 0.05$

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Role Models for Physical Activity

To understand the people who influenced physical activity in grade 3, 7, and 11 students, they were asked two separate questions. The first examined who encouraged them, while the second question asked who directly participated with them.

People Who Encouraged Physical Activity of Students

For the first question on role models who influenced physical activity, students were asked to identify from a list of potential people, who had helped them to be active (Table 3.3.10). The top three most influential people who encouraged students in any of the grades included: mothers, fathers, and friends. Differences between boys and girls were found for several role models.

Table 3.3.10: People who encourage physical activity, percentage and number (n)

Which of the following people help you to be active?	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Mother	91.2% (352)	91.1% (367)	84.4% (287)	87.1% (363)	60.5%* (184)*	71%* (282)*
Father	86.5%* (334)*	80.1%* (323)*	78.2% (266)	75.1% (313)	61.2% (186)	56.7% (225)
Other guardian/caregiver	22.3% (86)	19.6% (79)	18%* (61)*	11.8%* (49)*	10.2% (31)	8.8% (35)
Friends	83.4% (322)	86.4% (348)	58.2% (198)	60.4% (252)	58.9% (179)	59.2% (235)
Brother/sister	63.2% (244)	64.5% (260)	36.8% (125)	36.7% (153)	23.7% (72)	29.7% (118)
Coach	51.8%* (200)*	41.4%* (167)*	N/A	N/A	N/A	N/A
Homeroom teacher	36.3%* (140)*	44.4%* (179)*	26.5% (90)	20.9% (87)	3.6% (11)	5.3% (21)
Babysitter	27.3% (105)	28.9% (116)	3.2% (11)	3.6% (15)	0.3% (1)	0
Physical Education teacher	82.9% (320)	81.1% (327)	54.7% (186)	57.8% (241)	25.7% (78)	29.5% (117)
Playground supervisor	25.6% (98)	26.3% (105)	N/A	N/A	N/A	N/A
Principal	23.8% (92)	23.6% (95)	N/A	N/A	N/A	N/A
Club leader	15%* (58)*	23.6%* (95)*	N/A	N/A	N/A	N/A
Athlete (sports star)	17.1% (72)	4% (16)	12% (53)	9.4% (35)	7.5% (32)	1.9% (6)
Someone on TV	6.9% (29)	9.5% (38)	5.4% (24)	6.5% (24)	3.1% (13)	6.6% (21)
Rock star	2.8% (12)	9.5% (38)	1.4% (6)	1.9% (7)	1.2% (5)	1.9% (6)
Other people	10.4% (44)	12.6% (50)	7.5% (33)	18.9% (70)	5.9% (25)	17% (54)

*a significant difference between boys and girls at $p < 0.05$

For grade 3 students, fathers and coaches were indicated more frequently by boys as encouraging them than by girls. At the same time, homeroom teachers, and club leaders were

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listed more frequently by girls than boys. No sex differences were found for grade 7 students. Among grade 11 students, mothers were listed differently by boys and girls, that is, with girls noting they had been encouraged more frequently than the boys. Students were also given the opportunity to indicate if specific people in the media (e.g., someone on TV, athlete, rock star) influenced them to be active. For someone on TV, exercise shows, sports programs, ads, and Oprah were the most frequently listed items. For athletes, Sydney Crosby, Tony Hawk, Steve Nash, Michael Jordan, and Terry Fox were key role models. For rock stars, Hillary Duff, Little BowWow, Tim McGraw and Faith Hill, and “all girl bands” were considered to be influential in motivating physical activity.

People Who Participated Directly in Physical Activity with students

The second question on role models explored who directly participated with the students. Again, students were asked to list who they participated with from a list of people (Tables 3.3.11 and 3.3.12). For grade 3 students, they were only asked to indicate “yes/no” responses (see Table 3.3.11); while grade 7 and 11 students were also given the opportunity to provide a measure of how often they participated with the various people (Table 3.3.12).

Table 3.3.11: People who participate directly with grade 3 students, percentage and number (n)

Who participates with you?	Total	Boys	Girls
Friends	92.1% (725)	92.5% (356)	91.6% (369)
Mother	74.2% (584)	74.3% (286)	74.1% (298)
Brother/sister	73.3% (576)	73.0% (281)	73.6% (295)
Father	69.1% (544)	73.5%* (283)*	64.9%* (261)*
Other people	20.5% (168)	21.1% (84)	19.9% (84)
Babysitter	21.0% (164)	19.6% (75)	22.4% (89)
Other guardian/caregiver	16.4% (129)	18.2% (70)	14.8% (59)

*Significant difference between boys and girls at $p < 0.05$

For grade 3 students, friends, mothers, and brothers or sisters were the most frequently listed co-participants. Differences between boys and girls were only found for fathers, who were more frequently listed by boys than girls.

3.0 Study Findings

Information reported on the people who directly participated with grade 7 and 11 students (Table 3.3.12) is grouped by the often/very often responses. Friends were the most frequent direct participants with students in both of these grades, followed by team mates.

Table 3.3.12: People who participate directly with grade 7 and 11 students, percentage and number (n)

Who participates with you?	Grade 7		Grade 11	
	Boys	Girls	Boys	Girls
Friends	70.1% (235)	75.3% (301)	71.8%* (209)*	57.7%* (221)*
Team mate	75.7%* (209)*	65.4%* (210)*	62.3% (152)	59.4% (167)
Brother/sister	36.1% (103)	43.9% (157)	25.7% (65)	29.7% (96)
Father	25.8% (77)	23.8% (89)	9.3% (24)	12.4% (40)
Mother	11.4%* (34)*	19%* (72)*	7.4%* (19)*	13.8%* (47)*
Other people	4.6% (17)	6.8% (30)	0.3% (1)	1.1% (5)

*Significant difference between boys and girls at $p < 0.05$

Parent Role in Physical Activity of Students

Parents were asked several questions to explore the role they played in encouraging or facilitating their children's participation in physical activities (Table 3.3.13). They indicated on a scale from never to very often their level of involvement. Responses are grouped together for often/very often and reported below. The most common roles that parents of grade 3 children played were encouraging participation, attending as a spectator, and enjoying physical activities (themselves). These roles were similar for parents of grade 7 and 11 students; however, talking about the benefits of physical activity was identified more frequently by these parents than enjoying physical activity.

An interesting finding from the parent surveys was the small percentage of parents who were engaging in physical activity. Only thirty-six percent of grade 3 parents reported being physically active with their children and forty-two percent of parents were active on their own. These percentages were even smaller for parents of grade 7 and 11 students.

Table 3.3.13: Parents involvement in children's physical activities, percentage and number (n)

To what extent/how often do you...	Grade 3	Grade 7	Grade 11
Encourage children to be physically active	83.2% (686)	78.2% (636)	67.3% (500)
Attend children's physical activities as a spectator	71.9% (590)	65.4% (532)	50.7% (377)
Enjoy physical activities	65.8% (640)	59.0% (480)	53.4% (397)
Drive children to physical activities	65.8% (540)	60.5% (492)	48.3% (359)
Talk about the benefits of physical activity	64.5% (529)	64.6% (525)	54.2% (403)
Enroll children in extracurricular physical activities	60.8% (499)	59.4% (483)	50.9% (378)
Talk about opportunities for physical activity	58.6% (480)	59.8% (486)	50.1% (372)
Participate in physical activities yourself	41.6% (341)	38.6% (314)	38.2% (284)
Be physically active with children	36.4% (299)	25.8% (210)	15.7% (117)
Attend children's physical activities as a volunteer	28.1% (239)	24.8% (202)	23.0% (171)
Attend children's physical activities as a coach	12.7% (104)	11.2% (91)	9.3% (69)

3.3.3 Screen time before and after school

Table 3.3.14 illustrates the percentage and number of students that reported watching television, playing on the internet and playing video/computer games before and after school by grade and sex. Television was the most reported screen time for all students. Internet use (the percentage who reported using the internet) increased from 38.6% and 41.0% in girls and boys respectively in grades 3 to 49.5% and 46.9% for girls and boys respectively in grade 7 to almost 2/3 of the sample in both sexes in grade 11. Finally, video game and computer game use appeared to decrease with grade level and this pursuit appears to be less attractive to females in general.

Table 3.3.14: Percentage and number (n) of students who reported screen time before and after school, by grade and sex

	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Watch TV	80.2% (319)	73.5% (310)	66.6% (247)	65.8% (291)	76.4% (243)	72.2% (307)
Internet	41.0% (163)	38.6% (163)	46.9% (174)	49.5% (219)	62.6% (199)	63.8% (271)
Video/ Computer games	73.4% (292)	48.3% (204)	57.1% (212)	40.0% (177)	58.5% (186)	27.5% (117)

Table 3.3.15 presents the reported number of hours spent watching television, the number of hours spent using the internet and the number of hours spent playing video/computer games by sex and grade. For television viewing, the number of hours reported increased with grade level but did not vary between boys and girls until grade 11. In grade 11, there was a significant difference ($p < 0.05$) in the number of hours boys and girls watched television with boys reporting 0.3 hours more on average per day. For internet use, the number of hours reported also increased with grade level but it did not differ significantly between boys and girls of the same grade. Video and computer game playing time was significantly larger for males compared to females in grade 3, 7 and 11. Playing time also increased with grade level. Overall, younger children spent less time in front of the “screen”, averaging 3.70 and 3.11 hours per day for boys and girls respectively while in grade 7, average screen time increased to 5.36 hours for boys and 4.78 hours for girls (Table 3.3.15). Finally, in grade 11, boys and girls spent on average 6.29 and 5.51 hours per day respectively in front of a screen.

Table 3.3.15: Average number of hours spent per day (before and after school) on screen time by grade and sex (SD)

Hours (SD)	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Watching TV	1.71 (1.05)	1.66 (0.96)	2.10 (1.60)	2.11 (1.42)	2.37 (1.86)	2.07* (1.14)
Internet	0.81 (0.87)	0.67 (0.88)	1.60 (2.11)	1.40 (1.17)	1.95 (1.47)	1.92 (1.38)
Video/ Computer games	1.18 (0.94)	0.78* (0.75)	1.66 (1.99)	1.27* (1.01)	1.97 (1.90)	1.52* (1.49)

*significant difference in the number of hours between boys and girls of that grade at $p < 0.05$

3.3.4 Socio-economic Status (SES) and Ethnicity

Socio-economic Status

There was diversity in socio-economic status of the participants which was reflective of the province of Nova Scotia. They were represented relatively equally across household income categories (see Table 3.3.16).

Table 3.3.16: Household income levels, by grade

Household Income	Grade 3	Grade 7	Grade 11
<\$30,000	19.9%	21.2%	19.4%
\$30,000-49,999	27.3%	21.4%	21.1%
\$50,000-79,999	31.5%	23.1%	25.6%
>\$80,000	21.3%	19.9%	17.4%
Employed full-time	51.7%	54.7%	55.7%

These data are representative of the province as average personal earnings for Nova Scotians were \$26,632 in the last census (Statistics Canada, 2001b). Note that the above table represents household income which may include 2 personal incomes.

3.0 Study Findings

Ethnicity

The vast majority of participants identified both their child and themselves as Canadian (see Tables 3.3.17 and 3.3.18) in each of the grades.

Table 3.3.17: Ethnicity of student sample, by grade

Race/ethnicity of child	Grade 3	Grade 7	Grade 11
Canadian	92.1%	88.6%	86.7%
Aboriginal	3.0%	1.7%	2.3%
French Canadian	3.8%	2.3%	2.7%
African Canadian	2.8%	2.3%	1.5%
Acadian	3.3%	2.5%	1.7%
European	2.2%	4.1%	2.7%
Other	1.8%	2.0%	2.5%

Table 3.3.18: Ethnicity of parent sample, by grade

Race/ethnicity of parent	Grade 3	Grade 7	Grade 11
Canadian	90.7%	87.8%	85.5%
Aboriginal	2.9%	1.6%	1.5%
French Canadian	3.7%	1.8%	1.7%
African Canadian	2.6%	1.6%	1.2%
Acadian	2.8%	2.5%	2.2%
European	3.0%	4.9%	4.4%
Other	6.5%	3.4%	2.7%

The above portrait is representative of the province as recorded in the last census. English was identified as the official language for most Nova Scotians (834,315, 93%), with French the next most common language (34,155, 3.8%) (Statistics Canada, 2001c). Visible minorities accounted for 34,525 (3.8%) of the population of Nova Scotia (Statistics Canada, 2001d) of which Black Nova Scotians were the highest in number (19,670, 2.2%). In addition, 17,010 (1.9%) Nova Scotians identified themselves as Aboriginal in the last Census (Statistics Canada, 2001a).

3.3.5 Comparisons 2001-2005

Constraints

When comparing the 2001 constraints information with that obtained in 2005, we see similar trends. For example, grade 3 students in 2001 and 2005 reported the top three constraints as expense, lack of equipment and distance. As well, students in grade 7 and 11 continued to report too much school work and no one to go with as their primary constraints.

Self-efficacy

Generally, positive attitudes towards physical activity and the potential effects were found in 2001 and 2005. Students in both studies tended to feel they were able to participate in physical activities despite other options. As well, similar trends were noted by participants in terms of the positive effects for participating in physical activity. There were slight differences in the percentage of people identifying the various effects and a few sex differences, such as girls in grade 7 in 2001 identified weight control as an effect of physical activity more than the boys, but this difference was not found in 2005 in this grade. However, weight control was identified more frequently by the girls in grade 11 in both studies than by the boys.

Role models

Similar trends between 2001 and 2005 were found for the role models who encouraged and participated with the students. In particular, mothers, fathers, and friends were the most frequent people who encouraged students to be active and friends were the most popular direct participants.

Transportation to and from school

A smaller percentage of students in grade 3 and 11 were using active methods of transportation to and from school, such as walking or biking, in 2005 than in 2001 (see Tables 3.3.19 and 3.3.20). The only exception was grade 11 in poor weather. More grade eleven students were biking to school in poor weather in 2005 than did in 2001. Otherwise, regardless of grade or weather, there were smaller percentages of students in these two grades who were using active transportation to or from school. Fewer grade 7 students were biking to school in 2005 than 2001, but more were walking to school regardless of weather.

Table 3.3.19: Comparison of transportation to school in good weather between 2001 and 2005, percentage and number (n)

Transportation to school in good weather	Grade 3		Grade 7		Grade 11	
	2001	2005	2001	2005	2001	2005
Take the bus	58.2% (329)	65.5% (537)	70.9% (395)	59.5% (484)	57.6% (300)	52.9% (393)
Walk	25% (141)	15.4% (126)	18.5% (103)	20% (163)	18.8% (98)	15.2% (113)
Driven by someone	14.7% (83)	14.8% (121)	8.1% (45)	12.1% (98)	18.6% (97)	16.0% (119)
Bike	2.1% (12)	0.1% (1)	1.8% (10)	0.9% (7)	1.3% (7)	0.7% (5)
Drive themselves	N/A	N/A	N/A	N/A	3.6% (19)	6.9% (51)

3.0 Study Findings

Table 3.3.20: Comparison of transportation to school in poor weather between 2001 and 2005, percentage and number (n)

Transportation to school in poor weather	Grade 3		Grade 7		Grade 11	
	2001	2005	2001	2005	2001	2005
Take the bus	57.5% (325)	62.6% (513)	73.4% (409)	56.8% (462)	58% (302)	52.8% (392)
Walk	13.5% (76)	6.5% (52)	5.9% (33)	10.2% (83)	9.2% (48)	7.3% (54)
Driven by someone	28.5% (161)	26.8% (220)	20.3% (113)	25.2% (205)	29.4% (153)	25.4% (189)
Bike	0.4% (2)	0	0	0	0	0.4% (3)
Drive themselves	N/A	N/A	N/A	N/A	3.5% (18)	5.7% (42)

3.0 Study Findings

Screen Time before and after school

When comparing the 2005 data with 2001, slight adaptations had to be made as the question was revised to examine daily usage rather than weekly, as requested in 2001 (see Table 3.3.21 and 3.3.22). The first table shows data as it was directly reported by the students, while the second table has been converted into daily numbers to allow for better comparison with 2005.

Table 3.3.21: Average number of hours spent per week on screen time (before and after school) by grade and sex in PACY 2001 (SD)

Hours per week (SD)	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Watching TV	10.38 (7.67)	10.12* (6.07)	11.03 (11.68)	8.97 (7.85)	13.17 (11.47)	10.60* (9.0)
Computer	0.81 (0.87)	0.67 (0.88)	5.68 (7.07)	4.89 (6.27)	9.23 (9.08)	7.92 (7.63)
Video games	4.59 (4.61)	2.30* (1.94)	5.37 (8.26)	3.22* (6.95)	5.25 (6.08)	2.79* (2.87)

*significant difference in the number of hours between boys and girls of that grade at $p < 0.05$

Table 3.3.22: Average number of hours spent per day on screen time (before and after school) by grade and sex in PACY 2001

Hours per day	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
Watching TV	1.48	1.45*	1.56	1.28	1.88	1.51
Computer	0.11	0.10	0.81	0.70	1.32	1.13
Video games	0.66	0.33*	0.77	0.46*	0.75	0.40*

*significant difference in the number of hours between boys and girls of that grade at $p < 0.05$

This converted information has then been used to directly compare total screen time for each grade and sex. Overall, time spent on screen has increased substantially from 2001 to 2005 (see Table 3.3.23).

Table 3.3.23: Overall daily screen time (before and after school) comparison between 2001 and 2005 by grade and sex

Hours per day	Grade 3		Grade 7		Grade 11	
	Boys	Girls	Boys	Girls	Boys	Girls
PACY 2001						
Total screen time	2.25	1.88	3.14	2.44	3.95	3.04
PACY 2005						
Total screen time	3.70	3.11	5.36	4.78	6.29	5.51

3.3.6 Regional Comparisons

Physical Activities

Physical activities at school

Some significant differences were found for students' participation in physical activities by Sport and Recreation Regions in the province. Differences were found for grade 3 students for involvement in clubs while at school, with South Shore, Fundy, and Central having the highest participation levels ($p < 0.05$). Grade 7 students had significant differences in several activities at school as well ($p < 0.05$). More students from Cape Breton, South Shore and Highland participated on school sports teams than those in other parts of the province. As well, intramurals had differences in participation across the province with more youth in Highland, Central, and the South Shore reporting involvement. For grade 11 students, there were significant differences for intramurals and clubs. Intramurals was more frequently reported by students living in Highland, Valley, and Central, while clubs were more often noted by Highland, Cape Breton, and Fundy.

Physical activities before or after school

Differences by SSR were also found for participation outside of school for several variables. In particular, grade 3 students had differences for participating outside alone, in pickup sports in their neighbourhood, and in a youth group. Students in the South Shore were more likely to play outside alone by approximately 12% more than the other regions (with 71.9% the highest in the South Shore and the next highest was 58.5% Valley). Grade 3 students in Central, Cape Breton and Highland were more likely to report playing pickup sports than the other regions, while Central, the Valley, and South Shore had the highest rates of participation in youth groups.

Similar to grade 3 students, students in grade 7 reported a high percentage of students living in the South Shore playing outside alone; however, Fundy reported a slightly higher percentage. Students in the South Shore in grade 7 also reported high percentages of playing outside with friends, with Cape Breton and Central also reporting high numbers in this grade.

For grade 11 students, significant regional differences were again found for playing outside alone and with friends, as well as playing sports in a youth group. Similar to students in other grades, South Shore reported some of the highest levels for playing outside. Central and Fundy also had high percentages for playing outside with friends and Highland and Valley had high percentages for playing outside alone. The highest numbers reporting playing sports in a youth group were living in Central followed by South Shore and Highland.

It was not possible to report on the specific physical activities by region as the numbers were too small for several of the activities.

Constraints

No significant differences in SSR were found for constraints among grade 3 students. For grade 7 students, there were significant differences for several variables. Interestingly, in each case, students in the South Shore reported experiencing the constraint consistently more than any of the other regions. Constraints where a significant difference were found ($p < 0.05$) included: "no one to go with" (42% South Shore, 35.9% Central, 31% Highland), "school work takes too much time" (40.7% Valley, 40.6% South Shore, 38.8% Highland), "it is not fun anymore" (13.8% South Shore, 11% Valley, and 7.1% Fundy), and "I don't know how" (15.2% South Shore, 11% Valley, 7.8% Highland).

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For grade 11 students, significant regional differences were found for two variables: “it’s too far away” and “school work takes too much time”. Students in Fundy (32.7%), Highland (32.5%), and Valley (32.0%) more frequently reported distance as a factor preventing them from participating in physical activity. For school work, students in Valley (58.6%), Central (52.9%), and Highland (52.5%) more frequently listed too much school work as preventing them from participating in physical activity.

Role models

Significant differences were found for the people who encouraged students to be active. For grade 3 students, club leaders were more frequently reported as a motivator for students in certain regions. In particular, Central reported a higher number of club leaders as motivational, while few students in Highland noted these people ($p < 0.05$). Another difference for motivators was the playground supervisor. A much larger percentage of students in Cape Breton identified playground supervisors than the other regions, and students in Central reported these people the least often ($p < 0.05$).

Grade 7 students had significant differences ($p < 0.05$) by region for two motivators: other guardians/caregivers and homeroom teachers. For other guardians/caregivers, students in South Shore, Central, and Fundy reported these people as motivators more frequently than students in other regions. For homeroom teachers, students in Fundy, Central, and Cape Breton reported these teachers as motivators more frequently than students in other regions.

There were also significant regional differences for grade 11 students in terms of the people encouraging them to be active ($p < 0.05$). Differences were found for mothers, brothers/sisters, friends, and physical education teachers. For mothers, more students in Fundy (73.8%), Highland (70.8%), and Central (69.4%) identified their mother as encouraging them. For brothers/sisters, students in Highland (41.7%), Central (27.3%), and Fundy (27.1%) identified siblings as their motivator more frequently than in other regions. Friends were more commonly listed by students in Central (73.6%), Highland (61.7%), Fundy (57.9%), and South Shore (57.9%) than other regions. Finally, physical education teachers were more often cited by Valley (42.2%), Fundy (42.1%), and Highland (30%) than other areas.

Screen Time

No significant differences were found in screen time among the six SRRs.

3.4 Dietary Intake

3.4.1 Demographic Characteristics

This section describes the demographic characteristics of 1469 grade 7 and 11 students attending schools in Nova Scotia. Since not all students responded to all questions, the sample sizes (n) vary as indicated in the tables and figures.

Table 3.4.1: Age, grade, sex and language of respondents, overall

Characteristics		# respondents (n)	Percent (%)
Age		1469	
	12 years of age and under	464	31
	13 years of age	303	21
	14 or 15 years of age	14	1
	16 years of age	336	23
	17 years of age	326	22
	18 years of age and older	26	2
Grade		1469	
	Grade 7	773	53
	Grade 11	696	47
Sex		1469	
	Boys	653	44
	Girls	816	56
Language		1469	
	English	1438	98
	French	31	2

Of the 1469 students who identified their grade, about half were in grade 7 (53%) and about half were in grade 11 (47%). Slightly more girls than boys completed the survey. A greater percentage of girls in grade 11 completed the survey (57%) compared to the percentage of girls in grade 7 (54%).

3.0 Study Findings

Table 3.4.2: Age, grade, sex and language of respondents, by Sport and Recreation Region (SRR)

Characteristics		CB	Highland	Fundy	Valley	South Shore	Central
Age	12 years of age	34%	37%	32%	33%	27%	28%
	13 years of age	21%	17%	18%	17%	30%	23%
	16 years of age	25%	19%	27%	24%	17%	27%
	17 years of age	19%	26%	21%	24%	24%	20%
	18 years of age	1%	1%	2%	2%	2%	2%
Grade	Grade 7	55%	54%	50%	49%	57%	52%
	Grade 11	45%	46%	50%	51%	43%	48%
Sex	Boys	61%	55%	63%	57%	47%	51%
	Girls	39%	45%	37%	43%	53%	49%
Language	English	100%	100%	96%	100%	100%	98%
	French	-	-	4%	-	-	2%

A slightly higher percentage of grade 7 students in the South Shore region completed the survey, while fewer students in grade 7 in the Fundy region participated in the web-based survey. A greater percentage of boys than girls in the Fundy region completed the survey, while fewer boys attending schools in the South Shore region participated in the study. Fundy and Central SRRs were the only regions in which French-speaking students participated in the survey.

3.4.2 Anthropometric Measures - Self-Reported and Measured BMI

Students self-reported their weight and height on the web-based dietary survey, and physical measurements of height and weight were taken in conjunction with the larger PACY dataset. These data were used to calculate Body Mass Index (BMI). This section presents the differences in self-report and measured BMI, in addition to the average physical measurements of weight, height and BMI.

Self-reported and measured mean BMI differed significantly for all students (overall), for boys, girls, grade 7 and grade 11 students. However, the extent of bias did not differ by sex or grade. Students consistently under-estimated their BMI, meaning they either over-estimated their height, under-estimated their weight, or some combination of both, on the web-based survey. Since significant differences were found between self-reported and measured data, this report presents the results from the physical measurements of height and weight.

Table 3.4.3: Self-reported and measured BMI

BMI		Self-report		Measured	
		Mean	SD	Mean	SD
Overall¹		21.7	4.5	22.2	4.1
Sex	Boys²	21.8	4.6	22.2	4.0
	Girls¹	21.6	4.4	22.3	4.2
Grade	Grade 7²	20.3	4.6	20.7	3.7
	Grade 11¹	22.9	4.0	23.6	4.0

¹Significant difference between self-report and measured BMI at $p < 0.001$

²Significant difference between self-report and measured BMI at $p < 0.05$

3.4.3 Perceptions of Body Weight

Of 1346 respondents, 72% perceived their weight to be average, while 12% believed their weight was below average and 16% reported their weight to be above average. All responses reported have been controlled for clustering of students within schools.

Description of Weight

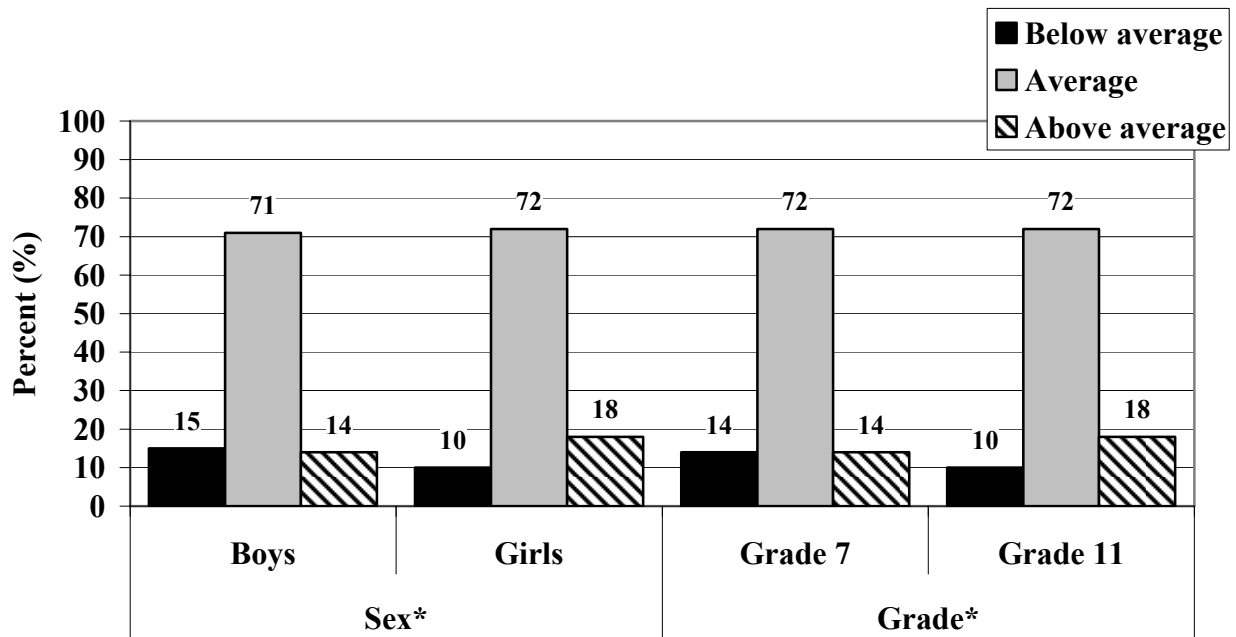


Figure 3.4.1: Subjects perception of their weight

*Significant difference at $p < 0.05$

The majority of students reported their weight as being average. Comparing sexes, significantly more girls felt their weight was above average, and more boys described their weight as below average ($p < 0.001$). Significant differences were also found in how grade 7 and grade 11 students describe their weight. A greater proportion of grade 11 students reported their weight to be above average, while more grade 7 students said their weight was below average. No differences were found by SRR in terms of weight description.

Concerns about Weight

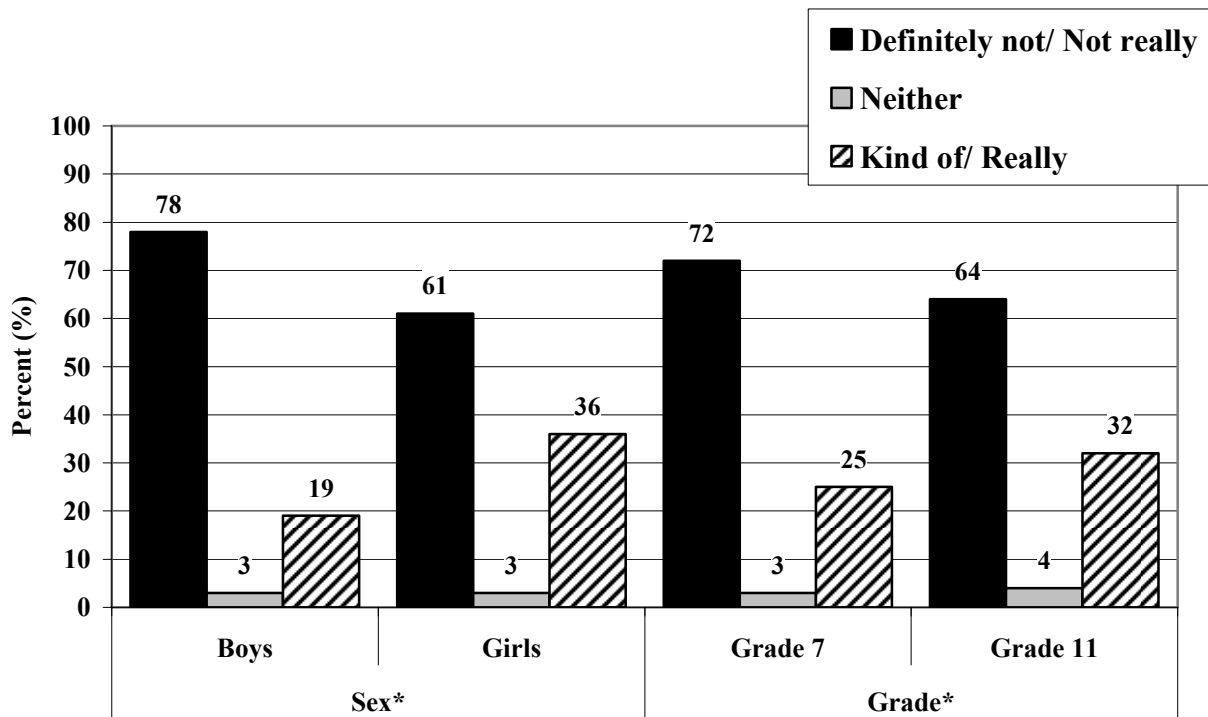


Figure 3.4.2: Concern that weight is too high, by sex and grade

*Significant difference at $p < 0.001$

Significant differences were found between boys and girls in their responses to the statement “I am concerned that my weight is too high.” Over one-third of girls felt that their weight was too high. Girls were significantly more likely to say that they were “kind of” or “really” concerned about their weight being too high compared to boys ($p < 0.001$). A significantly greater proportion of students in grade 11 also expressed concern about their weight being too high, compared to grade 7 students ($p < 0.001$). No differences were found by SRR in terms of concerns about weight being too high. Preliminary research by the University of Waterloo group (Woodruff, Hanning et al, 2005) suggests that those concerned about their weight tended to report “eating less than usual to lose weight” and to skip meals more often and consume lower intakes of all foods, including those in the nutrient-dense food groups.

3.0 Study Findings

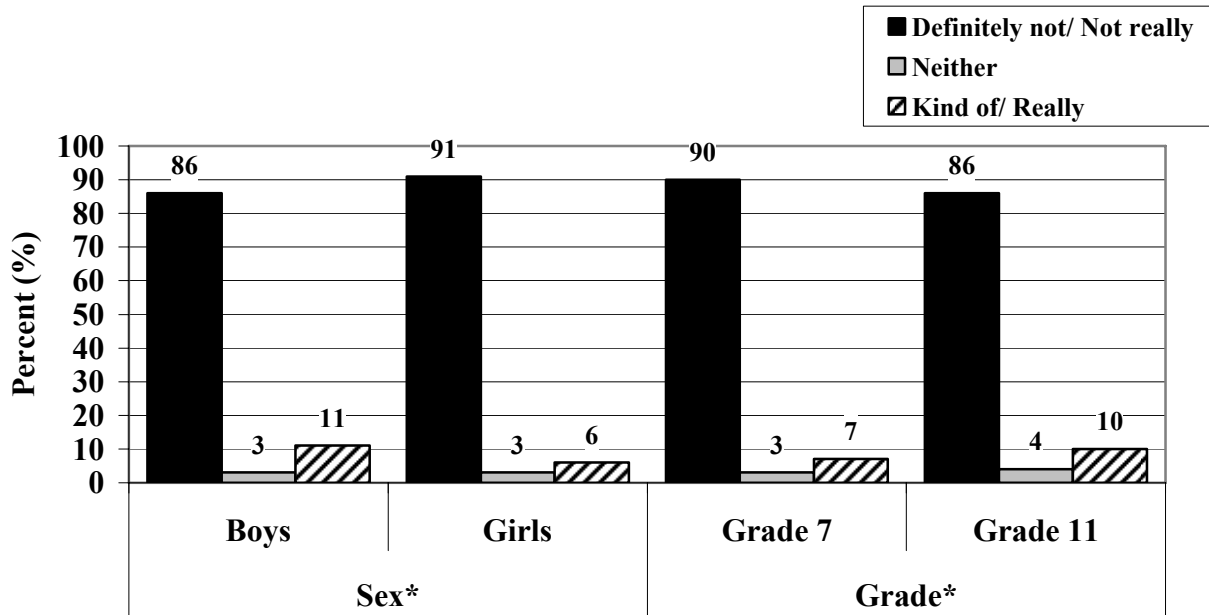


Figure 3.4.3: Concern that weight is too low, by sex and grade

*Significant difference at $p < 0.05$

Most of the students reported that they were not concerned their weight was too low, but significant differences did exist by sex and grade. More boys than girls ($p=0.001$) and more grade 11 than grade 7 students ($p=0.018$) reported that they “kind of” or “really” agreed with the statement “I am concerned my weight is too low”.

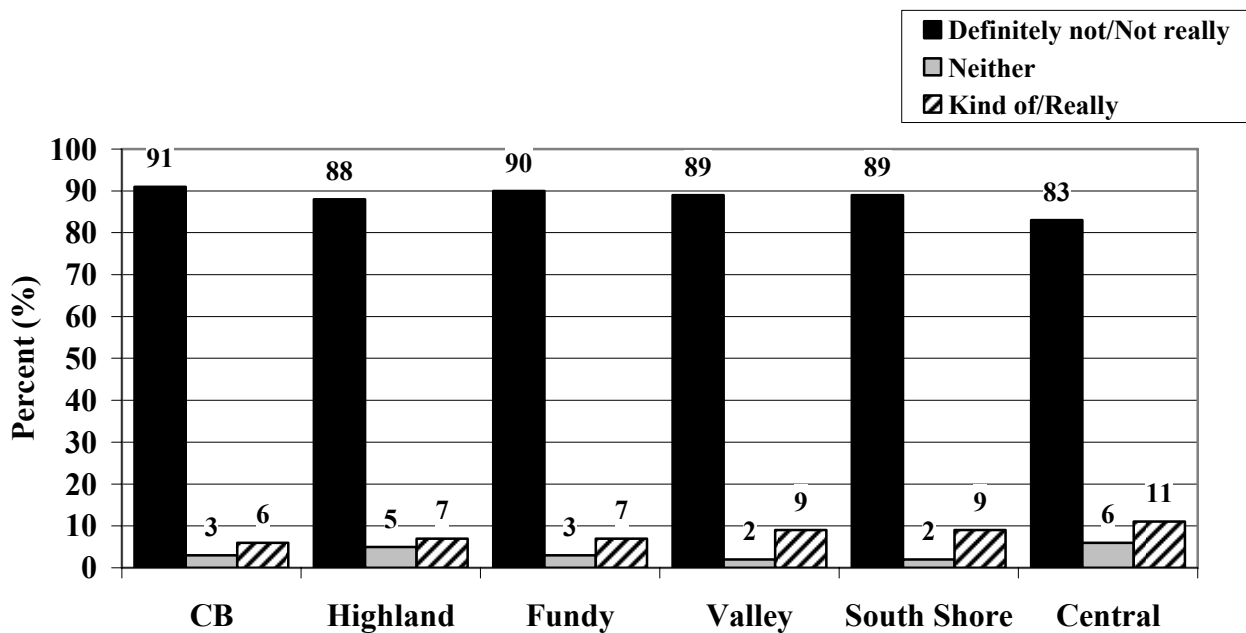


Figure 3.4.4: Concern that weight is too low, by Sport and Recreation Region (SRR)

*Significant difference by Sport and Recreation Region (SRR) at $p=0.002$

3.0 Study Findings

In terms of concern that weight is too low, significant differences were found by Sport and Recreation Region (SRR) ($p=0.002$). A greater proportion of students from Central region expressed concern that their weight is too low, compared to all other regions, while CB students were the most likely to be unconcerned that their weight is too low.

Changes in Eating Patterns

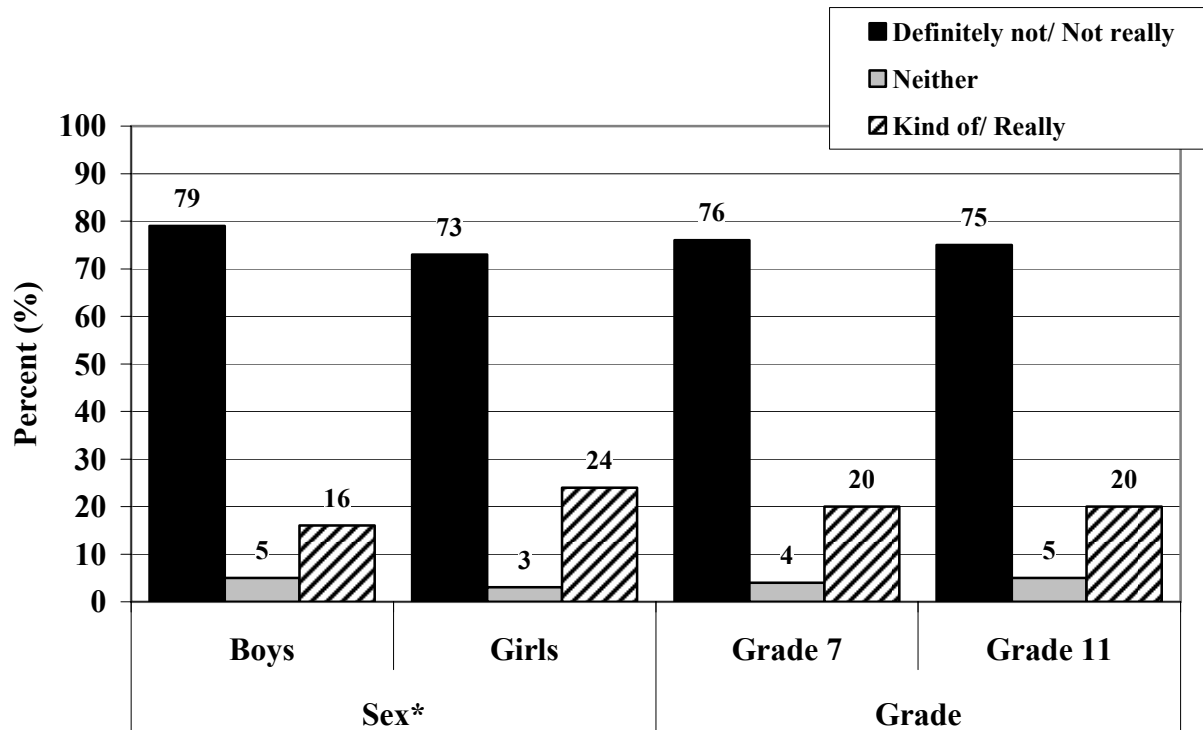


Figure 3.4.5: Eating less to lose weight, by sex and grade

*Significant difference at $p<0.001$

While no differences were found by grade in response to the statement “I am eating less than usual to try and lose weight”, significant differences were found by sex. Girls were significantly more likely than boys to indicate that they were “kind of” or “really” eating less than usual to lose weight ($p<0.001$). No significant differences were found by Sport and Recreation Region (SRR). The high prevalence of ‘dieters’ may contribute to the low energy intakes observed in this study.

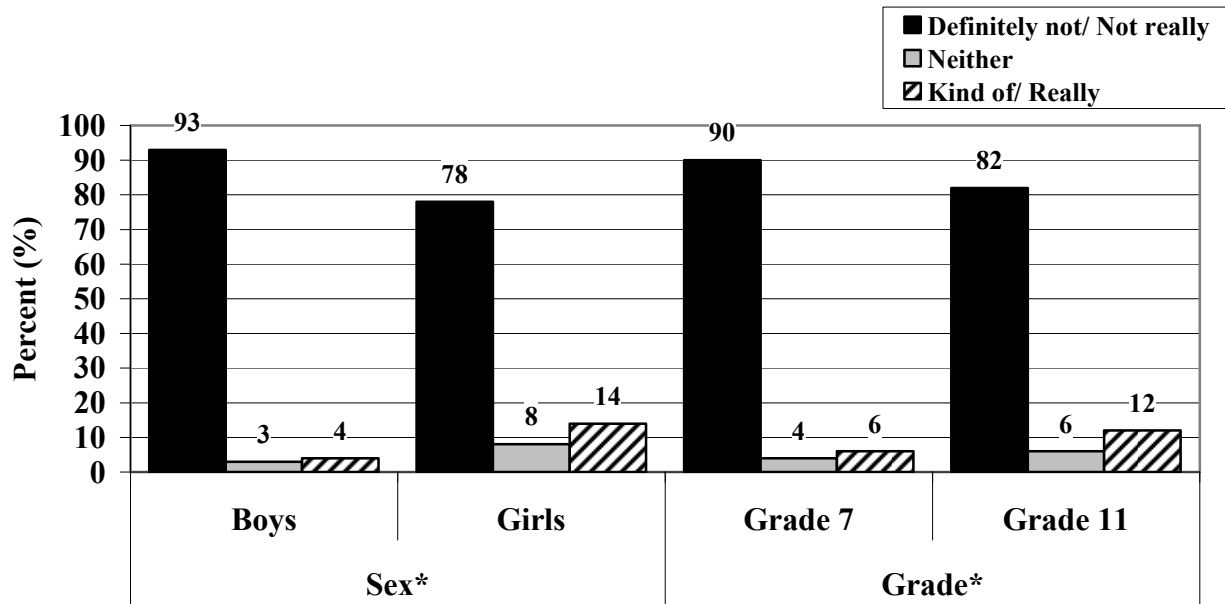


Figure 3.4.6: Eating more to gain weight, by sex and grade

*Significant difference at $p < 0.001$

In response to the statement “I am eating more than usual to gain weight”, boys and girls and students in grades 7 and 11 differed significantly. More boys indicated that they were “kind of” or “really” eating more than usual to gain weight compared to girls ($p < 0.001$). In addition, significantly more grade 11 students and grade 7 students were eating more than usual to gain weight ($p < 0.001$). No differences were found by SRR in terms of eating more than usual to gain weight.

3.4.4 Nutrient Intakes

The following tables outline the median intakes of selected nutrients from foods consumed as reported by respondents by sex and grade on the 24 hour dietary recall. The percent of respondents who fell below, met or exceeded Adequate Intakes (AI) or the Estimated Average Requirements (EAR) as outlined by Dietary Reference Intakes (DRI) standards are also presented by sex and grade.

Overall Median Intakes of Selected Nutrients

Table 3.4.4: Estimated median nutrient intakes, all students (n=1469)

Nutrient	Median	Interquartile Range
Energy (kcal)	1790	1257, 2468
Protein (g)	68	46, 97
Carbohydrates (g)	227	158, 313
Fibre (g)	10	6, 15
Fat (g)	68	43, 100
% Energy from Fat	34	28, 40
Saturated Fat	24	15, 36
% Energy from Saturated Fat	12	9, 15
Added Sugar (g)	43	22, 78
Vitamin A (RE)	653	375, 1225
Vitamin D (µg)	5.4	2.6, 9.5
Folate (µg)	203	128, 301
Calcium (mg)	981	567, 1516
Iron (mg)	10.0	6.8, 14.3
Zinc (mg)	8.5	5.4, 12.3

*Note that the mean energy intake was 1967 kcal/d.

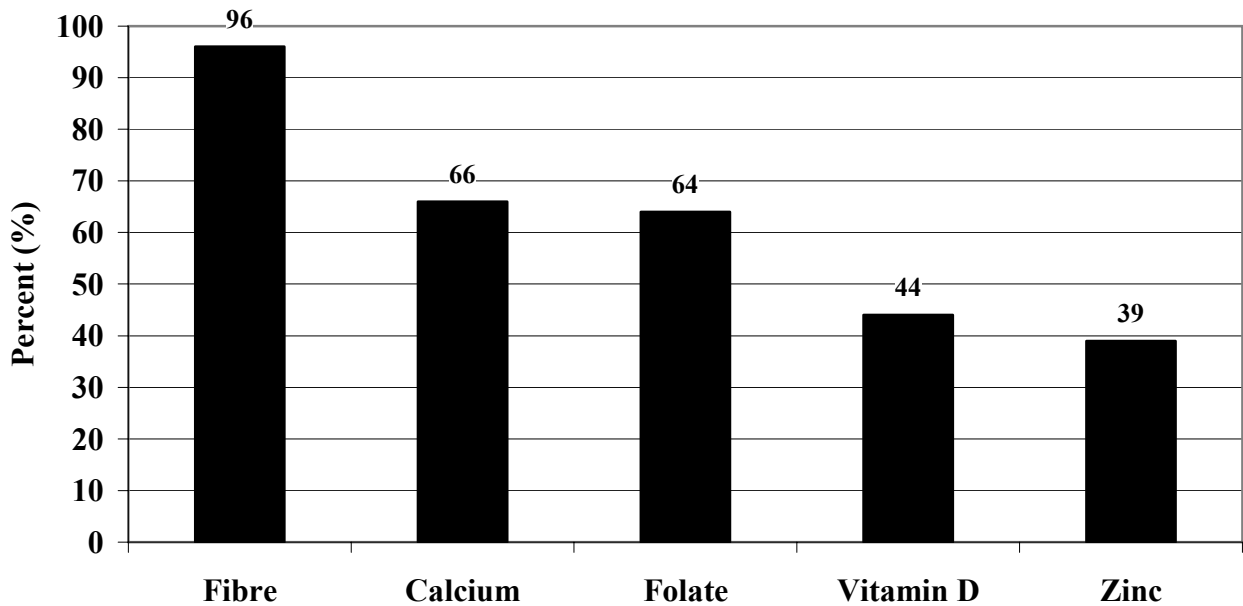


Figure 3.4.7: Percentage of students falling below EAR or AI for Fibre, Calcium, Folate, Vitamin D, and Zinc Intake, overall

Figure 3.4.7 outlines nutrients for which at least one third of the students did not meet either the set Estimated Average Requirements (EAR) or Adequate Intake (AI) level. Almost all of the respondents (96%) did not meet the AI for fibre (31g/day for boys, 26g/day for girls). Over half of the students (66%) did not meet the AI for calcium (1300mg/day) and 44% were below the AI for vitamin D (5µg/day). It must be noted, however, that AIs are not based on the same assumptions as EARs and the number cannot be taken to indicate the prevalence of inadequate intakes within the population. Almost two-thirds of the students (64%) did not consume enough folate to meet the EAR (250µg/day) and 39% were below the EAR for zinc (7 mg/day).

Overall Median Intakes of Selected Nutrients by Sex and Grade

Table 3.4.5: Estimated median nutrient intakes by sex

Nutrient	Boys (n=653)		Girls (n=816)	
	Median	Interquartile Range	Median	Interquartile Range
Energy ¹ (kcal)	2122	1468, 2911	1605	1120, 2149
Protein ¹ (g)	82	57, 115	60	40, 80
Carbohydrates ¹ (g)	259	187, 362	202	146, 272
Fibre ² (g)	11	6, 17	9	6, 14
Fat ¹ (g)	78	50, 118	62	37, 88
% Energy from Fat	35	29, 40	34	28, 40
Saturated Fat ¹ (g)	29	18, 42	21	13, 31
% Energy from Saturated Fat ²	12	10, 15	12	9, 14
Added Sugar ¹ (g)	50	27, 86	38	21, 68
Vitamin A ¹ (RE)	734	421, 1334	608	348, 1088
Vitamin D ¹ (µg)	6.4	2.9, 11.1	5.0	2.5, 8.8
Folate ¹ (µg)	231	152, 331	185	117, 269
Calcium ¹ (mg)	1153	656, 1819	888	522, 1350
Iron ¹ (mg)	12.2	8, 2 17.6	8.8	6.0, 12.1
Zinc ¹ (mg)	10.4	6.7, 14.8	7.3	4.9, 10.4

¹Significant at p<0.001²Significant at p<0.05

Boys had significantly higher median intakes of all reported nutrients, with the exception of percent energy from fat. Note that the mean energy intake was 2275 kcal for boys and 1720 kcal for girls. This is below the average energy intakes of boys and girls age 9 to 13 of 2446 and 2035 kcal/day, respectively, obtained using one-on-one interviews by the CCHS (Garriguet, 2006). This is to be expected given the differences in approaches and population. The percent of energy from fat was higher than the 30.9% and 30.5% reported for Canadian 9 to 13 year old boys and girls, respectively (Garriguet, 2006).

3.0 Study Findings

Table 3.4.6: Estimated median nutrient intakes by grade

Nutrient	Grade 7 (n=736)		Grade 11 (n=677)	
	Median	Interquartile Range	Median	Interquartile Range
Energy¹ (kcal)	1693	1202, 2324	1924	1332, 2603
Protein² (g)	66	45, 95	70	47, 99
Carbohydrates¹ (g)	214	150, 289	240	167, 335
Fibre¹ (g)	9	5, 14	11	6, 17
Fat¹ (g)	65	39, 96	72	47, 106
% Energy from Fat	34	28, 40	35	27, 40
Saturated Fat² (g)	23	14, 35	25	15, 38
% Energy from Saturated Fat¹	12	9, 15	12	9, 14
Added Sugar² (g)	42	21, 73	44	24, 82
Vitamin A² (RE)	638	370, 1158	680	380, 1297
Vitamin D (µg)	5.4	2.5, 9.6	5.6	2.7, 9.2
Folate² (µg)	194	120, 282	214	141, 318
Calcium (mg)	964	557, 1495	991	594, 1546
Iron² (mg)	9.7	6.6, 13.7	10.5	6.9, 15.2
Zinc (mg)	8.2	5.3, 12.0	8.8	5.4, 12.6

¹Significant at p<0.001

²Significant at p<0.05

Students in grade 11 consumed significantly more total calories, protein, carbohydrates, fibre, fat, saturated fat, added sugar, vitamin A, folate and iron compared to students in grade 7. Percent energy from saturated fat also differed significantly by grade, with grade 7 students consuming more of their energy from saturated fat.

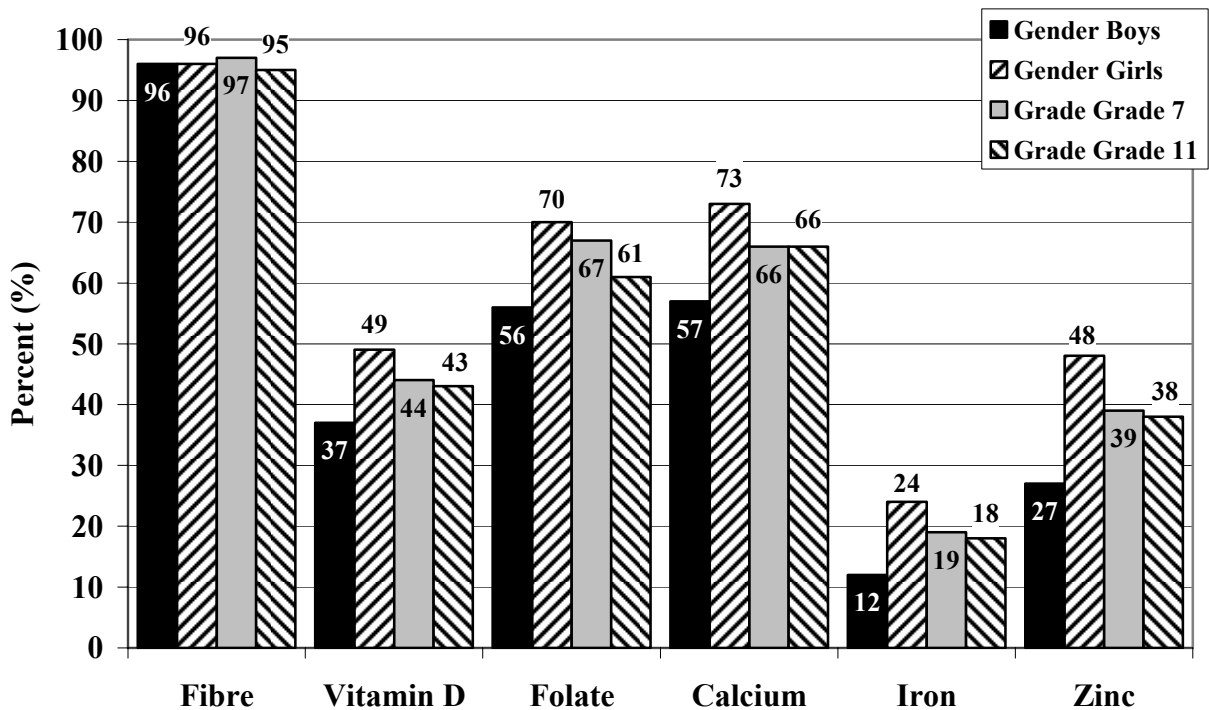


Figure 3.4.8: Percentage of students falling below EAR or AI for Fibre, Vitamin D, Folate, Calcium, Iron, and Zinc Intake, by sex and grade

Significant differences were found between boys and girls with respect to the percentage of students not consuming enough vitamin D ($p < 0.001$), folate ($p < 0.001$), calcium ($p < 0.001$), iron ($p < 0.001$) and zinc ($p < 0.001$). Fewer girls met minimum recommendations compared to boys. At least half of the girls did not meet recommendations for fibre, folate and calcium, and almost half did not consume enough vitamin D or zinc. Significantly fewer grade 7 students met the recommendations for fibre ($p = 0.004$) or folate ($p = 0.031$), compared to grade 11 students. No other differences by grade were found to be significant.

3.4.5 Food Group Intakes

This section presents the overall median number of servings of all food groups respondents reported consuming and the percentage of students consuming less than the recommended number of servings per food group as outlined by *Canada's Food Guide to Healthy Eating (CFGHE)*. The numbers of servings per food group are also presented by sex and grade.

Overall Food Group Intakes

Table 3.4.7: Overall median food group intakes

Food Group	Mean # of servings	SD	Median # of servings	Interquartile Range
Grain Products	4.8	3.2	4.3	2.6, 6.3
Vegetables and Fruit	3.3	3.2	2.5	1.0, 4.8
Milk Products	3.1	2.5	2.5	1.2, 4.3
Meat and Alternatives ¹	2.6	2.4	2.1	1.0, 3.8
Other ²	6.4	4.7	5.4	3.1, 8.6

¹Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

²Servings for the Other Foods Category were determined by serving size based on Canadian Nutrient File 2001b

NOTE: No regional differences were found for these data; thus, pooled data are presented here.

For 4 to 18 year olds from the Atlantic provinces, the CCHS cycle 2.2 (2004) found the average number of servings to be 6.06 Grain Products, 3.77 Vegetables and Fruit, 2.32 Milk Products and 154 grams Meat and Alternatives (3.01 servings).

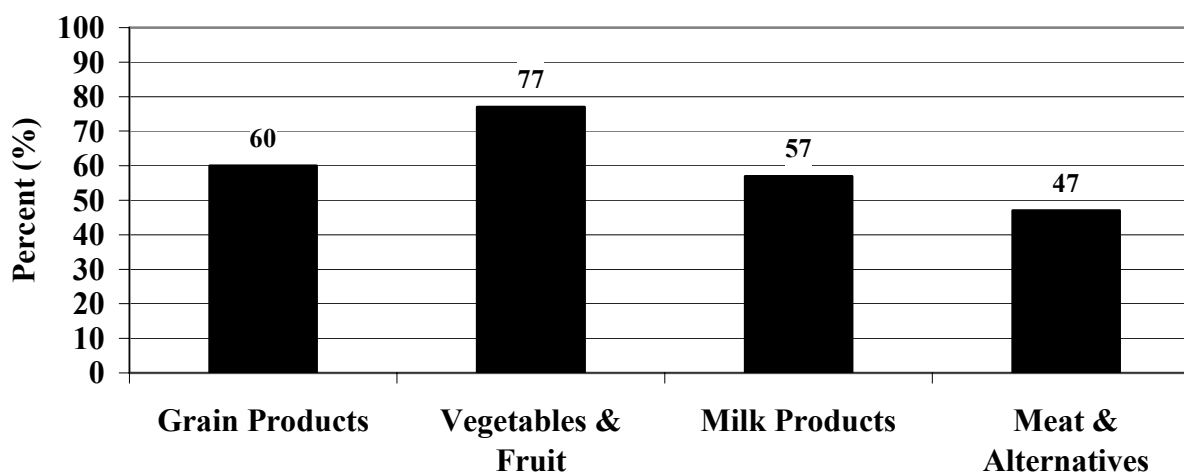


Figure 3.4.9: Percentage of students below *CFGHE* recommendations for food groups, overall

Note: Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

3.0 Study Findings

Over half of all students did not meet minimum *CFGHE* recommendations for Grain Products (5-12 servings), Vegetables and Fruit (5-10 servings), and Milk Products (3-4 servings), while almost half did not meet recommendations for Meat and Alternatives (2-3 servings). For 4 to 18 year olds from the Atlantic provinces, the CCHS (Garriguet, 2006) found that 79% did not meet minimum serving recommendations for Vegetables and Fruit – more than for the country as a whole. However, Veugelers, Fitzgerald et al (2005) observed a mean number of vegetable and fruit servings of 5.8 in Nova Scotia grade five students (n=5200), using a food frequency questionnaire, a method that tends to overestimate intakes. The Canadian Community Health Survey (CCHS) 2004 found that of 2 to 17 year olds across Canada, 21% consumed fruit and vegetables less than three times per day, 37% three to five times and 41% five times or more (Shields, 2005). It is noteworthy that the CCHS study found that children and adolescents who consumed five or more servings of fruit and vegetables per day were less likely to be overweight or obese (Shields, 2005). Thus, Vegetable and Fruit group intakes might be usable as an indicator of risk of excess weight gain.

Food Group Intakes by Sex

Table 3.4.8: Median food group intakes by sex

Food Group	Boys		Girls	
	Median # of servings	Interquartile Range	Median # of servings	Interquartile Range
Grain Products ¹	5.0	3.2, 7.3	3.9	2.3, 5.5
Vegetables and Fruit	2.4	0.8, 5.0	2.5	1.0, 4.4
Milk Products ¹	3.1	1.6, 5.2	2.2	1.0, 3.6
Meat and Alternatives ^{1,2}	2.8	1.3, 4.6	1.7	0.7, 3.0
Other ^{1,3}	5.7	3.4, 9.4	5.1	3.0, 7.9

¹Significant at p<0.001

²Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

³Servings for the Other Foods Category were determined by serving size based on Canadian Nutrient File 2001b

Boys had significantly higher median intakes of Grain Products (p<0.001), Milk Products (p<0.001), Meat and Alternatives (p<0.001) and servings of foods from the Other Foods Category (p=0.001) compared to girls.

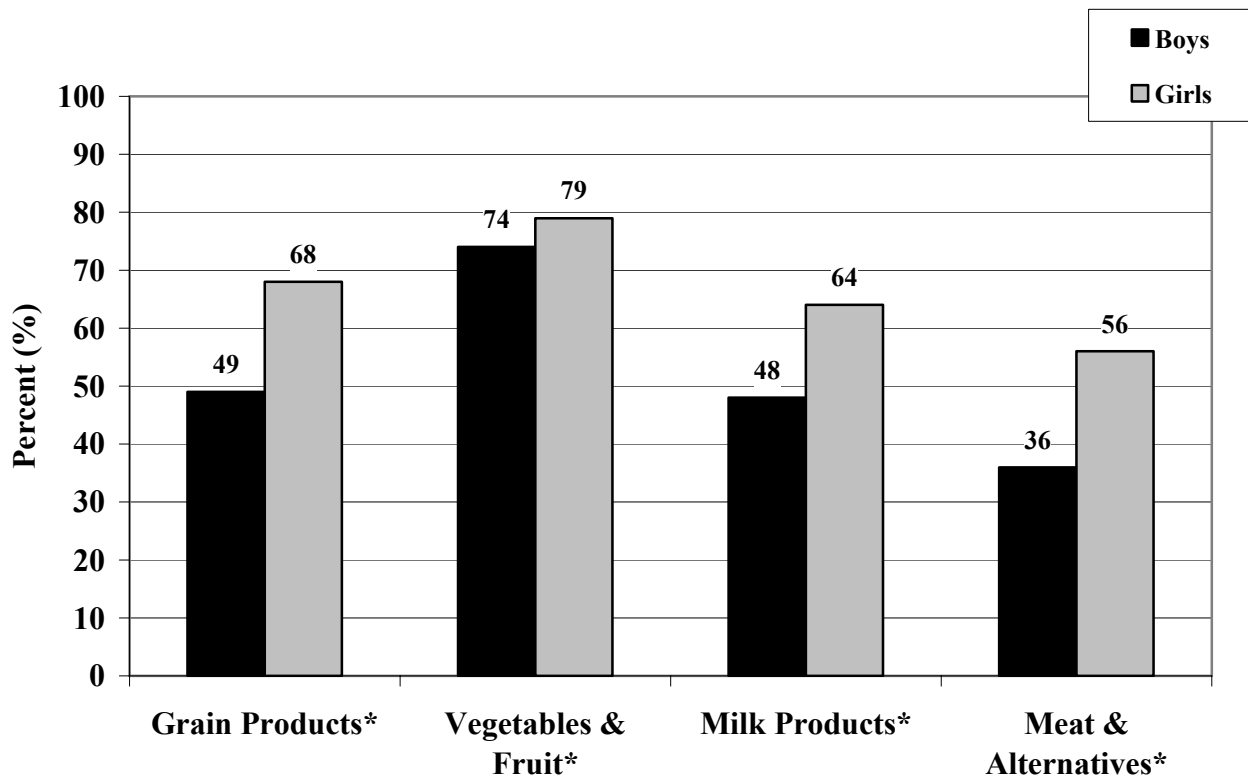


Figure 3.4.10: Percentage of students below *CFGHE* recommendations for food groups, by sex

*Significant at $p < 0.05$

Note: Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

Girls were significantly more likely to not meet *CFGHE* recommendations for any of the 4 food groups. Over half of the girls did not meet recommendations for any of the food groups, while around three quarters of both boys and girls did not meet recommendations for vegetable and fruit intakes.

The CCHS (cycle 2.2) found that 62% of 9 to 13 year old boys and 68% of 9 to 13 year old girls did not consume the minimum servings of Vegetables and Fruit (Garriguet, 2006). The data appear to be slightly worse for Nova Scotia students compared to the population of Canadian students with respect to fruit and vegetables intake. However, the students in this sample consumed more Milk Products compared to the Canadian population where 61% of 10 to 16 year old Canadian boys and 83% of 10 to 16 Canadian girls did not meet the minimum recommended servings. Interestingly, 68% of Nova Scotia female students did not meet recommended grain product servings versus 26% of Canadian 9 to 13 year old girls (Garriguet, 2006). This could explain some of the difference in energy intakes between the surveys. It should be noted that the CCHS found that data on 9 to 13 year old boys were too unreliable to be published.

3.0 Study Findings

Food Group Intakes by Grade

Table 3.4.9: Median food group intakes by grade

Food Group	Grade 7		Grade 11	
	Median	Interquartile Range	Median	Interquartile Range
Grain Products ¹	4.0	2.4, 5.9	4.5	2.8, 6.7
Vegetables and Fruit	2.4	0.9, 4.6	2.7	1.0, 5.0
Milk Products	2.5	1.2, 4.4	2.5	1.4, 4.2
Meat and Alternatives ²	2.0	1.0, 3.7	2.2	0.9, 3.9
Other ^{1,3}	4.6	2.7, 7.6	6.3	3.9, 9.6

¹Significant at $p < 0.05$

²Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

³Servings for the Other Foods Category were determined by serving size based on Canadian Nutrient File 2001b

Grade 11 students had significantly higher median intakes of Grain Products ($p=0.01$) and servings of foods from the Other Foods Category ($p < 0.001$) compared to students in grade 7. No other findings were significant.

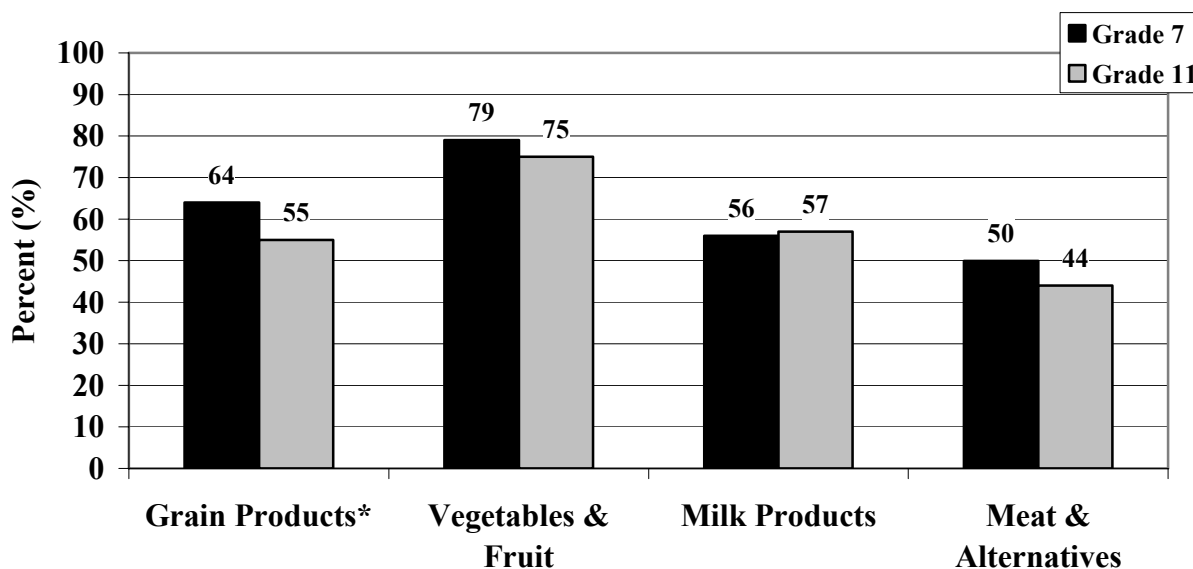


Figure 3.4.11: Percentage of students below *CFGHE* recommendations for food groups, by grade

*Significant at $p=0.008$

Note: Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

Grade 7 students were significantly more likely to not meet *CFGHE* recommendations for Grain Products ($p=0.008$). No other findings were significant.

3.0 Study Findings

Food Group Intakes Sport and Recreation Region (SRR) in Nova Scotia

Table 3.4.10: Median food group intakes by Sport and Recreation Region (SRR)

Food Group	CB	Highland	Fundy	Valley	South Shore	Central
	Median	Median	Median	Median	Median	Median
Grain Products	4.5	4.3	4.4	4.1	4.0	4.3
Vegetables and Fruit	2.2	2.8	2.4	2.9	2.0	2.9
Milk Products	2.5	2.7	2.5	2.5	2.3	2.7
Meat and Alternatives ¹	2.1	2.0	2.0	2.0	2.2	2.2
Other ²	5.5	6.0	5.7	5.4	4.7	5.6

¹Canadian Nutrient File 2001, 1 Meat and Alternatives serving = 50g

²Servings for the Other Foods Category were determined by serving size based on Canadian Nutrient File 2001b

No significant differences were found in median food group intakes by SRR. In terms of percent of students falling below minimum recommendations as set out by *CFGHE*, no significant differences were found following post hoc testing.

Energy Intakes from Other Foods Category

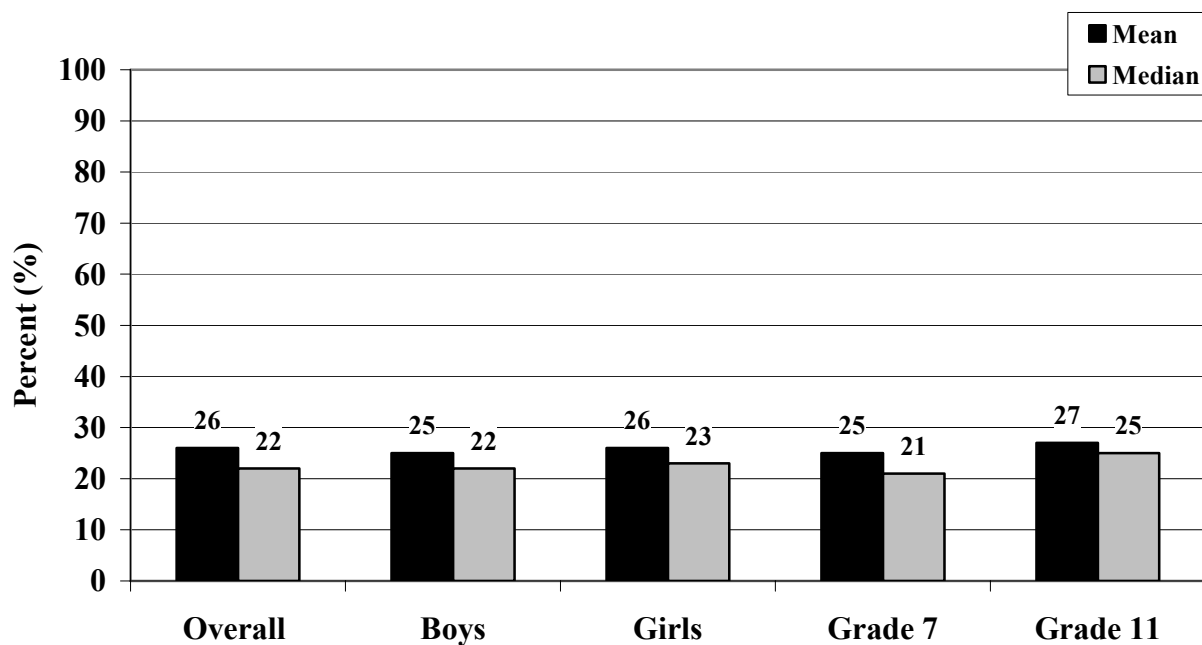


Figure 3.4.12: Percentage of total energy coming from foods from the Other Foods Category, by sex and grade

3.0 Study Findings

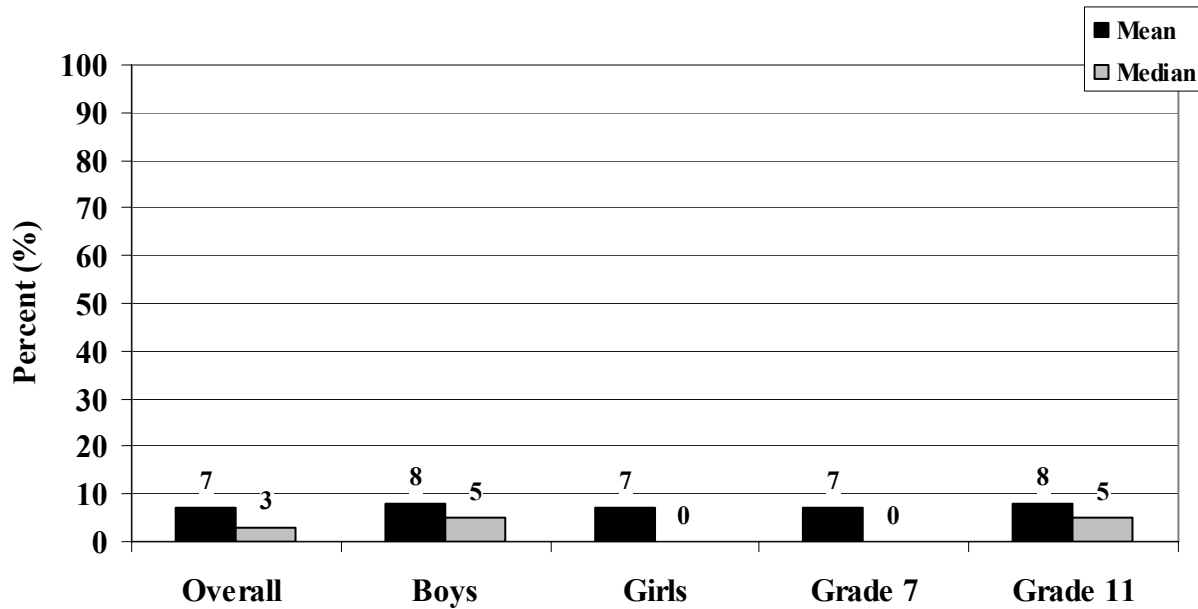


Figure 3.4.13: Percentage of total energy consumption from high energy beverages, by sex and grade

Students in this sample consumed, on average, about a quarter (26%) of their total energy intake from the Other Foods Category, and about 7% of their total energy intake from higher calorie beverages, including sweetened beverages such as fruit drinks, iced tea, lemonade and carbonated beverages. Data from the NHANES survey indicated that approximately 8% of adolescent energy intakes were derived from soft drink consumption (Troiano, Breifel, et al., 2000). When comparing median intakes, a significant difference was found by sex in terms of percent energy consumed from higher calorie beverages. Boys consumed a significantly higher median percentage of their total energy from higher calorie beverages than girls (5% versus 0%, respectively, $p=0.024$).

3.4.6 Food Behaviours

This section of the report highlights respondents' food behaviours. All responses in this section have been controlled for grade, sex and SRR.

Meal Frequency

On the day of the 24 hour diet recall, 73% (n=1469) of the students reported eating something for breakfast on the day prior to participating in the survey. Eighty-six percent of the respondents said they ate lunch and 90% ate dinner. In terms of snack consumption on the day prior to completing the web-based survey, 38% consumed a mid-morning snack, 16% ate a mid-afternoon snack, 58% snacked after school, 27% ate an early evening snack and 50% had a later evening snack.

Table 3.4.11: Meal consumption throughout the day

At what times did you eat anything yesterday?	Boys		Girls		Grade 7		Grade 11		
	%	n	%	n	%	n	%	n	
Breakfast¹									
Not mentioned	26	172	28	230	23	179	32	223	
Mentioned	74	481	72	586	77	594	68	473	
Middle of the morning snack									
Not mentioned	65	423	61	495	61	473	64	445	
Mentioned	35	230	39	321	39	300	36	251	
Lunch									
Not mentioned	14	95	13	105	12	97	15	103	
Mentioned	86	558	87	711	88	676	85	593	
Middle of the afternoon snack²									
Not mentioned	81	527	87	707	86	661	82	572	
Mentioned	19	126	13	109	14	111	18	124	
After school snack									
Not mentioned	42	272	42	342	40	313	43	301	
Mentioned	58	381	58	474	60	460	57	395	
Dinner/supper									
Not mentioned	10	62	11	89	11	85	10	66	
Mentioned	90	591	89	727	89	688	90	630	
Early evening snack¹									
Not mentioned	70	460	74	606	75	581	70	485	
Mentioned	30	193	26	210	25	192	30	211	
Later evening snack²									
Not mentioned	43	280	56	453	52	403	47	330	
Mentioned	57	373	44	363	48	370	53	366	

¹Significant difference by grade at p<0.01

²Significant difference by sex at p<0.01

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In terms of at which times students ate anything on the day prior to participating in the web-based survey, significantly more boys reported consuming a middle of the afternoon snack ($p=0.004$) and a later evening snack ($p<0.001$). Significant differences were also found by grade. More participants in grade 7 reported consuming breakfast ($p=0.004$), and significantly more grade 11 students reported that they had eaten an early evening snack on the night before participating in the survey ($p=0.01$).

In terms of SRR, significant differences were found only in terms of proportion of students consuming a middle of the morning snack. The percentage of students consuming a middle of the morning snack were as follows: 24% CB, 32% Central, 38% South Shore, 40% Fundy, 44% Highland and 47% Valley ($p=0.05$).

Breakfast Consumption

This section presents responses regarding the frequency with which respondents reported consuming breakfast by sex and grade.

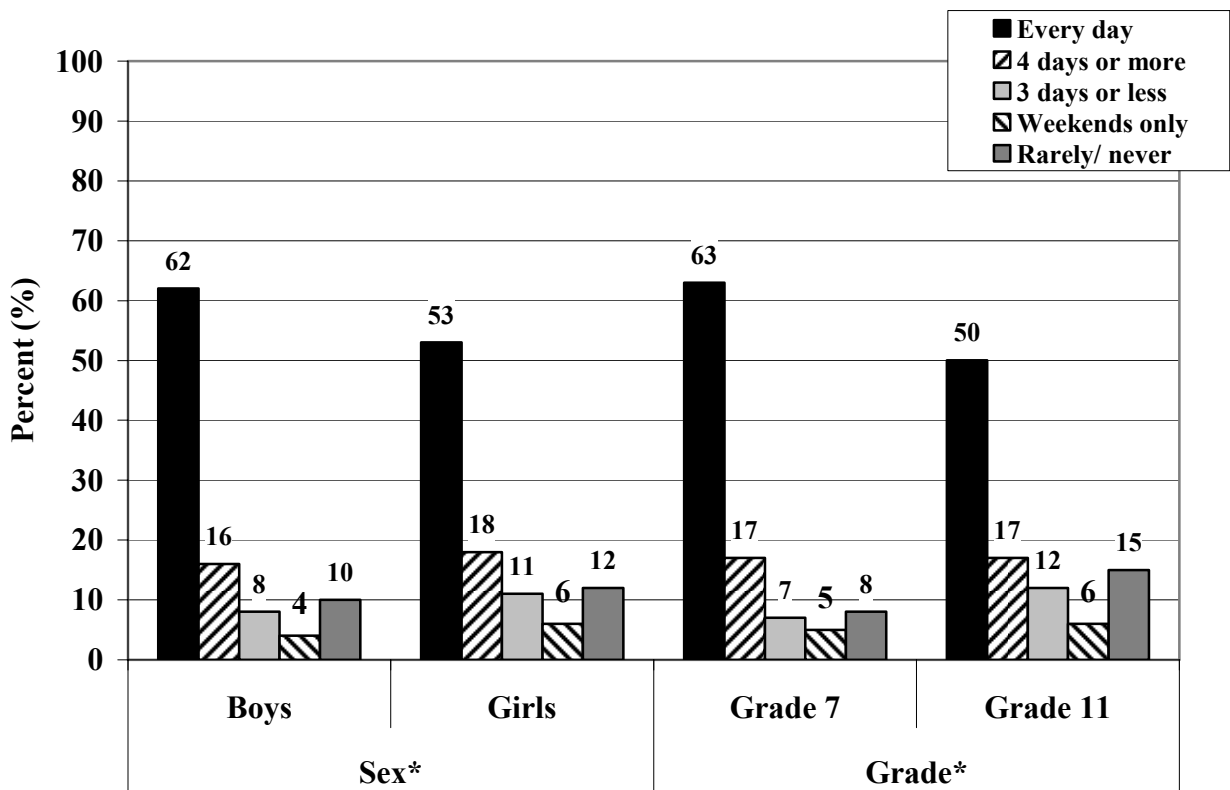


Figure 3.4.14: Breakfast frequency, by sex and grade

*Significant at $p\leq 0.001$

Significant differences were found in the frequency with which students reported eating breakfast by sex and grade. Boys were significantly more likely to report eating breakfast every day, while more girls reported skipping breakfast ($p=0.001$). Students in grade 7 were also more likely to report eating breakfast every day compared to grade 11 students ($p<0.001$). Fifteen percent of the students in grade 11 indicated that they rarely or never eat breakfast. In a study of

3.0 Study Findings

US students in grades 9 through 12, males were found to consume a healthier breakfast more often than females, while breakfast consumption decreased with increasing grade level (Young & Fors, 2001).

These findings appear to be similar to those of other Canadian studies. In a survey of Ontario and PEI students, Evers and coworkers (2001) found that, while 82% of grade four students ate breakfast every day, only 62% of grade eight students did so. In students from Peel Region of southern Ontario, only 57%, 51% and 40% of grade 6, 7 and 8 girls ate breakfast every day, as did 79%, 63% and 58% of grade 6, 7 and 8 boys, respectively (Hanning & Lambraki, 2003). Among high school students, Cohen and colleagues (2003) found that only 49% of South-western Ontario boys and 36% of girls ate breakfast daily. Hence, the current finding for frequency of breakfast consumption appears to be similar to other Canadian surveys. Clifton, Hanning and Lambraki (2005) observed that grade nine and ten breakfast consumers from Ontario and Alberta were more likely to be male, non-smokers, not reportedly “eating less to lose weight” and infrequent consumers of cola. Hence, breakfast consumption may be a proxy index for other diet and health related behaviours.

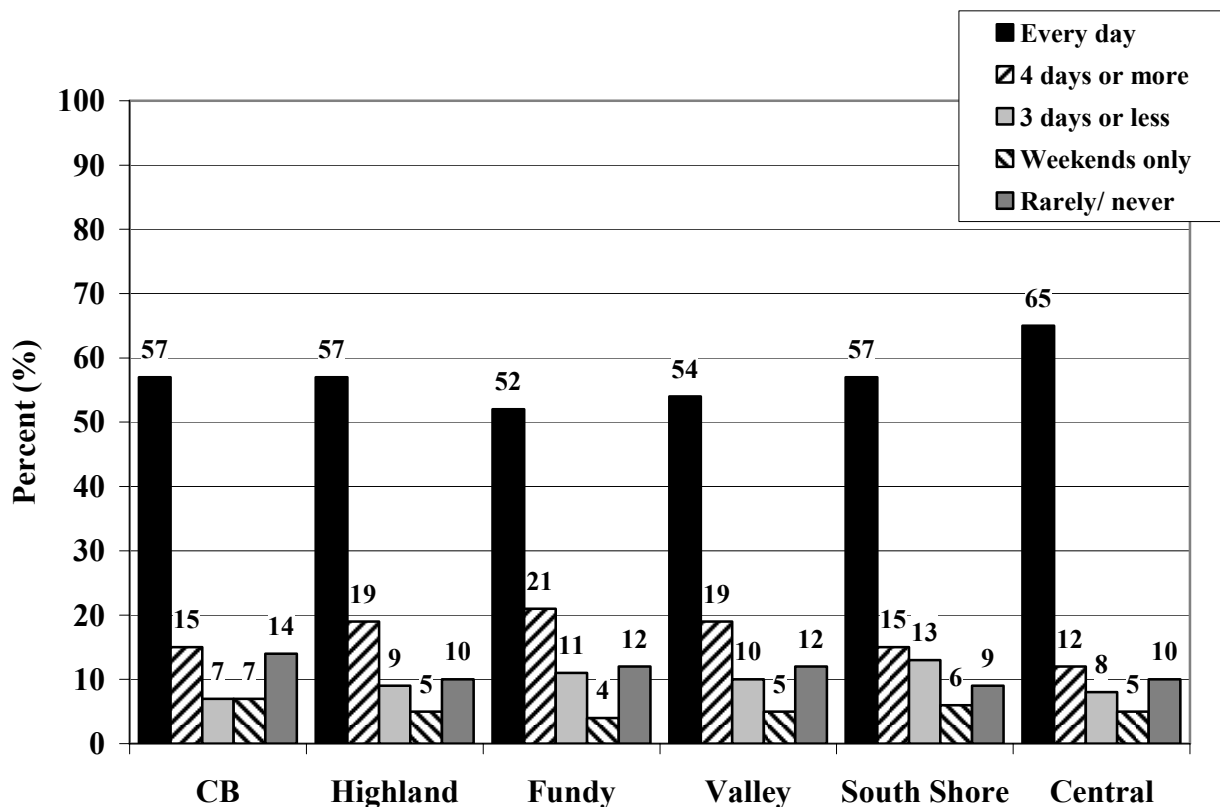


Figure 3.4.15: Breakfast frequency, by Sport and Recreation Region (SRR)

Significant differences were found by region in terms of frequency of consuming breakfast ($p=0.017$). Students residing in the Central region were more likely to report eating breakfast every day, while those in CB were the most likely to report that they rarely or never eat breakfast.

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School Snack/Breakfast Program Participation

On the day of the 24 hour diet recall, 9% (n=132) of the students reported participating in the school snack/breakfast program. Significant differences were found between boys and girls, with boys being more likely to participate (11% boys, 7% girls, $p=0.003$). Ten percent of grade 7 students and 7% of grade 11 students participated in a school snack or breakfast program, but these findings were not significantly different by grade.

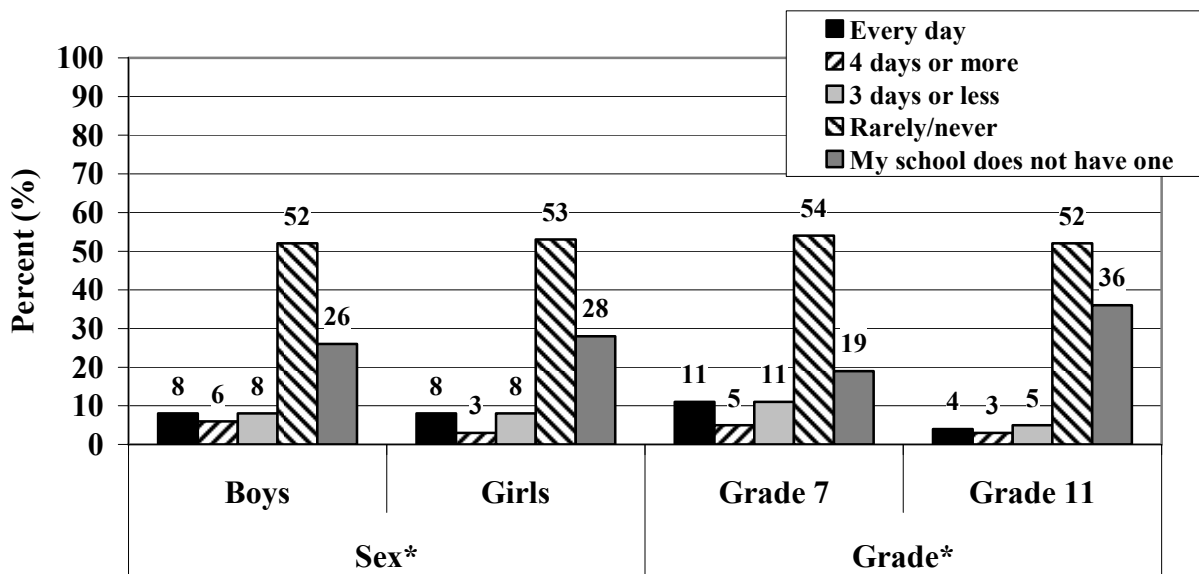


Figure 3.4.16: School snack/breakfast program participation, by sex and grade

*Significant at $p<0.05$

Significantly more boys indicated that they participated in a school snack or breakfast program at least once a week, while more girls reported that they rarely or never eat these foods, or that their school does not have a school snack or breakfast program ($p=0.03$). In terms of school snack or breakfast program participation by grade, significantly more grade 7 students reported participating in their school's programs. More grade 11 students indicated that their school does not have such a program.

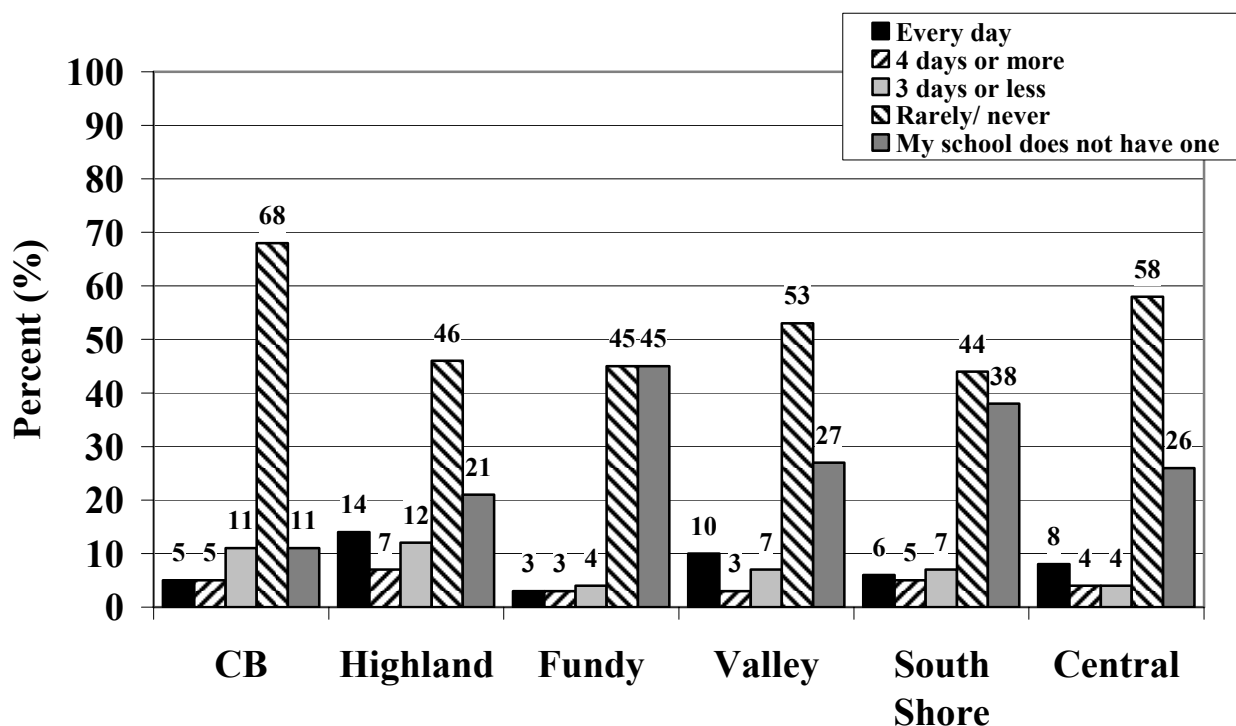


Figure 3.4.17: School snack/breakfast program participation, by Sport and Recreation Region (SRR)

Significant differences were found by region in terms of frequency of participating in the school breakfast or snack program ($p=0.002$). Students residing in the Highland region were more likely to report participating in their school’s snack or breakfast program every day. Over three-quarters of the students attending schools in all of the regions except Highland, reported that they rarely or never participated in their school’s snack or breakfast program, or that their school does not have such a program.

Energy Intakes by Meal

Table 3.4.12: Energy Intakes by meal, by sex

Meal	Overall		Boys		Girls	
	Mean ± SD	Median	Mean ± SD	Median	Mean ± SD	Median
Breakfast ¹	444 ± 361	399	536 ± 412	487	370 ± 295	340
Lunch ¹	497 ± 379	431	564 ± 483	470	443 ± 314	406
Dinner ¹	635 ± 434	560	749 ± 494	654	543 ± 353	491
Other times	367 ± 399	266	397 ± 440	284	343 ± 362	251

¹Significant difference by sex at $p<0.0001$

3.0 Study Findings

Students consumed the highest energy intakes at dinner, followed by lunch, breakfast and 'other times'. Thirty-three percent of total energy was consumed at dinner, 26% at lunch, 23% at breakfast and 18% at 'other times'. Boys consumed significantly more energy than girls at all meals, with the exception of snacks, where intakes did not differ significantly.

Table 3.4.13: Energy Intakes by meal, by grade

Meal	Grade 7		Grade 11	
	Mean \pm SD	Median	Mean \pm SD	Median
Breakfast¹	471 \pm 366	416	414 \pm 354	376
Lunch¹	459 \pm 334	410	538 \pm 420	458
Dinner¹	586 \pm 385	518	689 \pm 477	600
Other times²	308 \pm 356	225	433 \pm 434	334

¹Significant difference by grade at $p < 0.05$

²Significant difference by grade at $p < 0.0001$

While energy intakes at breakfast were significantly higher for grade 7 students compared to grade 11 students ($p = 0.0001$), students in grade 11 had higher energy intakes for lunch ($p = 0.015$), dinner ($p = 0.0003$) and 'other times' ($p < 0.0001$).

3.0 Study Findings

Where and With Whom Respondents Ate their Meals and Snacks

The web-based survey asked students where and with whom they had eaten meals or snacks the day before completing the survey. This section presents their responses by sex, grade and SRR.

Table 3.4.14: Locations for meal and snack consumption, by sex and grade

Where did you eat yesterday?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Breakfast^{1,2}								
At home/another home	84	500	76	582	86	616	73	466
At school	3	17	4	33	3	20	5	30
Other	1	7	3	20	1	11	2	16
Did not eat	12	75	17	126	10	70	20	131
Morning snack^{1,2}								
At home/another home	13	58	7	46	14	80	5	24
At school	56	258	55	336	59	333	52	261
Other	4	16	3	17	3	19	3	14
Did not eat	27	126	35	212	24	133	40	205
Lunch^{1,2}								
At home/another home	20	122	20	156	25	185	14	93
At school	66	406	70	537	68	499	68	444
Other	10	62	5	42	4	31	11	73
Did not eat	4	23	5	42	3	18	7	47
Afternoon snacks²								
At home/another home	60	292	58	377	67	398	50	271
At school	13	64	10	68	11	64	13	68
Other	7	32	7	45	5	29	9	48
Did not eat	20	97	25	162	17	105	28	154
Dinner^{1,2}								
At home/another home	91	571	87	676	93	690	83	557
At school	1	10	1	12	2	13	1	9
Other	7	43	8	60	4	27	12	76
Did not eat	1	6	4	30	1	8	4	28
Evening snacks								
At home/another home	87	478	76	515	85	533	77	460
At school	1	5	1	6	0	2	1	9
Other	3	20	6	41	3	21	7	40
Did not eat	9	48	17	115	12	75	15	88

¹Significant difference by sex at p<0.05

²Significant difference by grade at p<0.001

Almost all of the students reported eating breakfast at home. However, significant differences were found by sex and grade. Girls were more likely to report that they did not eat breakfast yesterday, while more boys ate breakfast at home or another home (p=0.027).

3.0 Study Findings

Significantly more grade 11 than grade 7 students skipped breakfast on the day before completing the web-based survey ($p < 0.001$).

Morning snacks and lunch were most often consumed at school, with significant differences occurring by sex and grade. Girls were more likely to report that they did not eat either of these meals while more boys reported eating their morning snack at home ($p = 0.022$) and their lunch at an “other” location, for example a restaurant or fast food outlet ($p = 0.004$). Grade 11 students were more likely to report not consuming either a morning snack or lunch at all on the day prior to completing the web-based survey ($p < 0.001$ for both morning snacks and lunch). Grade 7 students were more likely than grade 11 students to report consuming both their morning snack and lunch at home. More grade 11 students ate lunch at an “other” location.

The majority of the respondents ate afternoon snacks, dinner and evening snacks at home. Locations for eating afternoon snacks differed only by grade, with more grade 11 students reporting not eating an afternoon snack ($p < 0.001$). In terms of dinner consumption, significant differences were found by sex ($p = 0.007$) and grade ($p < 0.001$). Fewer girls reported eating dinner and evening snacks at home, compared to boys, and were more likely to report skipping these meals. Grade 11 students were also more likely to report skipping dinner or eating dinner at an “other” location, compared to students in grade 7.

3.0 Study Findings

Significant differences were found by SRR in terms of where students ate their morning snack ($p=0.0002$), lunch ($p=0.0024$), afternoon snack ($p<0.0001$) and evening snack ($p<0.0001$, Table 3.4.15). No other findings were significant.

Table 3.4.15: Locations for meal and snack consumption, by Sport and Recreation Region (SRR)

Where did you eat yesterday?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
Breakfast												
At home/another home	77	182	82	202	81	156	77	177	80	180	80	185
At school	4	9	5	11	3	6	3	7	4	8	4	9
Other	1	3	1	3	3	5	2	5	2	4	3	7
Did not eat	18	42	12	30	14	26	18	42	14	32	13	29
Morning snack¹												
At home/another home	11	18	9	18	11	17	4	7	11	20	15	24
At school	44	75	63	132	54	83	71	135	54	101	42	68
Other	2	3	4	8	1	2	3	6	3	6	5	8
Did not eat	43	74	24	51	34	51	22	41	32	59	38	62
Lunch¹												
At home/another home	26	63	25	63	12	23	8	17	18	42	30	70
At school	56	139	64	163	76	151	78	180	72	168	61	142
Other	15	37	5	13	6	12	8	17	5	11	6	14
Did not eat	3	7	6	14	6	12	6	14	5	11	3	7
Afternoon snack²												
At home/another home	55	98	58	125	66	111	48	89	64	122	63	124
At school	9	17	14	31	7	11	14	27	9	18	14	28
Other	6	11	7	15	7	11	7	13	7	13	7	14
Did not eat	30	54	21	44	20	34	31	57	20	38	16	32
Dinner												
At home/another home	87	212	88	227	89	176	87	204	89	212	92	216
At school	1	3	2	5	1	3	1	3	3	7	0	1
Other	7	16	8	22	9	17	10	22	6	14	5	12
Did not eat	5	13	2	4	1	2	2	5	2	6	3	6
Evening snack²												
At home/another home	80	167	81	187	80	138	77	161	82	174	84	166
At school	1	2	2	4	1	1	1	2	1	2	0	0
Other	8	16	5	11	3	5	5	10	4	9	5	10
Did not eat	11	23	12	29	16	28	17	34	13	27	11	21

¹Significant difference by SRR at $p<0.01$

²Significant difference by SRR at $p<0.0001$

A significantly higher proportion of students in the Valley region reported that they ate their morning snack at school, compared to the other regions. In addition, more students attending schools in the CB region reported that they did not eat a morning snack, compared to all other regions. In terms of where students ate lunch, a greater proportion of Valley students

3.0 Study Findings

ate lunch at school, while almost a third of the students residing in the Central region ate lunch at home. More students from CB ate lunch at an “other” location, including fast food restaurants. Students attending schools in CB region and Valley region were the most likely to report that they did not consume an afternoon snack, while more Fundy and Valley region students said they did not eat an evening snack.

Table 3.4.16: People with whom respondents ate their meals and snacks, by sex and grade

Who did you eat with yesterday?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Breakfast^{1,2}								
By myself	47	294	37	293	38	281	45	306
At least one family member	38	234	41	322	50	367	28	189
Friends	2	12	3	28	1	11	4	29
Other/did not eat	13	84	19	150	11	82	23	152
Morning snack^{1,2}								
By myself	24	127	12	87	20	130	14	84
At least one family member	5	26	3	24	7	42	2	8
Friends	31	168	42	296	41	267	33	197
Other/did not eat	40	211	43	302	32	210	51	303
Lunch^{1,2}								
By myself	10	62	7	55	10	73	6	44
At least one family member	13	81	12	93	16	121	8	53
Friends	70	442	73	577	69	511	76	508
Other/did not eat	7	42	8	64	5	38	10	68
Afternoon snacks^{1,2}								
By myself	44	248	36	260	45	299	34	209
At least one family member	13	71	17	125	20	136	10	60
Friends	18	102	17	125	15	101	20	126
Other/did not eat	25	138	30	218	20	136	36	220
Dinner^{1,2}								
By myself	10	65	8	64	7	51	12	78
At least one family member	82	520	79	624	87	648	73	496
Friends	6	37	7	57	4	31	9	63
Other/did not eat	2	10	6	46	2	14	6	42
Evening snacks^{1,2}								
By myself	60	349	43	327	51	351	50	325
At least one family member	23	137	27	203	30	210	20	130
Friends	4	23	6	44	2	16	8	51
Other/did not eat	13	79	24	177	17	117	22	139

¹Significant difference by sex at p<0.01

²Significant difference by grade at p<0.001

In response to the question “Who did you eat with yesterday,” significant differences were found by sex and grade for all meals and snacks. Boys were more likely to report eating all meals and snacks alone, while more girls reported that they did not eat any of the meals or snacks. More girls also indicated that they eat breakfast (p<0.001), afternoon snacks (p=0.005)

3.0 Study Findings

and evening snacks ($p < 0.001$) with at least one family member ($p < 0.001$), and morning snacks ($p < 0.001$) and lunch ($p < 0.001$) with friends. On the other hand, more boys reported eating dinner with at least one family member ($p < 0.001$).

In terms of differences by grade, more grade 11 students reported not consuming all meals and snacks more often than grade 7 students. In addition, grade 11 respondents more often ate breakfast ($p < 0.001$), lunch ($p < 0.001$), afternoon snacks ($p < 0.001$), dinner ($p < 0.001$) and evening snack ($p < 0.001$) with friends. Students in grade 7 were more likely to report eating all meals and snacks with at least one family member, and more grade 7 students ate morning snacks with friends ($p < 0.001$).

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Table 3.4.17: People with whom respondents ate their meals and snacks, by Sport and Recreation Region (SRR)

Who did you eat with yesterday?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
Breakfast¹												
By myself	28	69	40	101	41	86	44	105	52	120	45	106
At least one family member	49	119	42	108	40	83	37	88	30	70	37	88
Friends	4	9	2	6	4	8	1	4	2	5	3	8
Other/did not eat	19	48	16	40	15	31	18	43	16	37	15	35
Morning snack²												
By myself	12	23	17	41	13	25	13	28	18	37	29	60
At least one family member	5	11	4	10	3	5	3	6	4	8	5	10
Friends	27	54	46	107	36	67	52	110	40	81	22	45
Other/did not eat	56	112	33	77	48	90	32	68	38	77	44	89
Lunch²												
By myself	5	12	13	32	6	13	7	18	7	16	11	26
At least one family member	19	47	15	39	7	14	6	15	11	27	14	32
Friends	70	171	67	173	76	156	78	186	74	173	68	160
Other/did not eat	6	14	5	13	11	23	9	21	8	19	7	16
Afternoon snacks²												
By myself	32	64	37	87	43	83	31	69	48	102	46	103
At least one family member	14	29	20	49	18	35	14	32	11	23	13	28
Friends	16	32	20	48	14	26	21	46	17	36	18	39
Other/did not eat	38	77	23	54	25	47	34	76	24	50	23	52
Dinner												
By myself	8	20	10	26	8	18	9	21	9	22	9	22
At least one family member	78	193	81	208	78	161	80	193	81	189	85	200
Friends	8	19	7	19	10	20	7	16	5	12	3	8
Other/did not eat	6	14	2	5	4	8	4	11	5	12	3	6
Evening snacks²												
By myself	47	110	50	123	45	87	47	109	52	114	60	133
At least one family member	25	58	26	63	27	51	27	61	27	59	21	48
Friends	8	19	6	16	5	9	3	7	4	8	4	8
Other/did not eat	20	46	18	43	23	44	23	53	17	36	15	34

¹Significant difference by SRR at p=0.0007

²Significant difference by SRR at p<0.0001

Significant differences were found by SRR in terms of with whom students ate breakfast (p=0.0007), morning snack (p<0.0001), lunch (p<0.0001), afternoon snack (p<0.0001), and evening snack (p<0.0001). Students from South Shore region were the most likely to report eating breakfast alone, while students from CB were significantly more likely to report eating breakfast with at least one family member. More students from the Valley region ate lunch with friends, compared to all other regions. CB region had the higher percentage of students reporting that they did not eat a morning or afternoon snack, while students attending schools in the Valley region were the most likely to report not eating an evening snack.

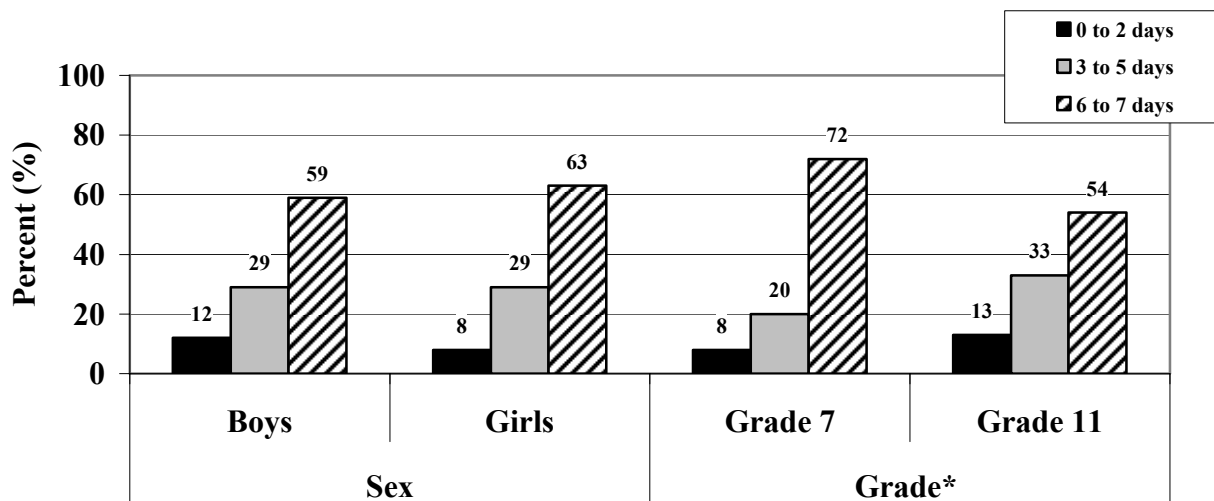


Figure 3.4.18: Frequency of eating dinner with at least one parent, by sex and grade

*Significant difference by grade at $p < 0.001$

While no significant differences were found in terms of frequency of eating dinner with at least one parent by sex, significant differences were found by grade. Significantly more grade 7 students reported consuming dinner with at least one parent on 6 or 7 days in a week, while more grade 11 students reported that they eat with at least one parent on 0 to 2 days in a week. No significant differences were found by SRR.

This trend in which the number of family dinners/meals consumed during a typical week declines with increasing age has also been seen in published literature (Gillman, Rifas-Shiman et al., 2000; Granner, Sargent et al., 2004; Story, Neumark-Sztainer et al., 2002). The family directly determines the physical and social environment which can ultimately influence behaviours, habits, and attitudes through socialization and modeling (Ritchie, Welk et al., 2005). Among North American children and adolescents, approximately 25 to 57% reported consuming meals together with their family on a regular basis (5 or more meals/week), whereas 14 to 35% consumed meals with family members only on some days or never (Gillman, Rifas-Shiman et al., 2000; Neumark-Sztainer, Hannan et al., 2003; Neumark-Sztainer, Wall et al., 2004; Story, Neumark-Sztainer et al., 2002; Veugelers, Fitzgerald et al., 2005; Videon and Manning, 2003). Since family dinners appear to have a positive effect on consumption of healthy foods (Gillman, Rifas-Shiman et al., 2000; Neumark-Sztainer, Hannan et al., 2003; Videon and Manning, 2003), and a negative effect on the consumption of fried foods (Gillman et al., 2000) and soft drinks (Gillman, Rifas-Shiman et al., 2000; Neumark-Sztainer, Hannan et al., 2003), family meals are to be encouraged. In a large sample of grade five students from Nova Scotia (Veugelers, Fitzgerald et al., 2005), the relative risk for having a poor diet quality was 14% lower for those children consuming dinner with family members greater than five times per week than for those eating with family only one to two times per week.

3.0 Study Findings

Food Frequency of Selected Items

Students were asked the frequency with which they consumed certain foods and beverages. This section presents the findings only on the frequency of consumption of foods and beverages included in both the English and French versions of the survey.

Table 3.4.18: Consumption frequency of selected food items, by sex and grade

How often do you eat the following foods?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Salty snacks (like chips or cheesies)²								
At least once/day	23	145	19	154	25	179	18	120
5-6 times/week	8	51	6	49	8	56	6	44
2-4 times/week	34	208	35	272	33	244	34	236
2-4 times/month	21	133	21	166	19	142	23	157
Rarely/never	14	86	19	153	15	112	19	127
French fries or other fried potatoes (wedges, poutine, etc.)^{1,2}								
At least once/day	9	57	7	54	11	78	5	33
5-6 times/week	10	60	6	50	8	57	8	53
2-4 times/week	38	234	35	274	35	251	38	257
2-4 times/month	31	196	33	257	31	227	33	226
Rarely/never	12	76	19	145	15	108	16	113
Vitamin-mineral pills (supplements/vitamins)²								
At least once/day	22	124	21	152	24	155	19	121
5-6 times/week	4	20	4	27	3	18	4	29
2-4 times/week	8	43	5	39	7	43	6	39
2-4 times/month	8	44	9	68	9	61	8	51
Rarely/never	58	323	61	439	57	362	63	400
Pizza¹								
At least once/day	5	33	2	18	5	35	2	16
5-6 times/week	5	30	2	19	4	26	3	23
2-4 times/week	27	167	21	162	24	176	22	153
2-4 times/month	51	323	55	431	51	374	56	380
Rarely/never	12	75	20	158	16	120	17	113
Candy or chocolate bars								
At least once/day	12	73	11	86	13	99	9	60
5-6 times/week	10	61	12	93	11	81	11	73
2-4 times/week	30	188	32	25	31	225	32	217
2-4 times/month	30	190	27	209	28	204	29	195
Rarely/never	18	111	18	144	17	122	19	133
Game^{1,2}								
At least once/day	3	18	2	15	3	20	2	13
5-6 times/week	5	28	2	17	3	18	4	27
2-4 times/week	18	110	13	95	11	75	20	130
2-4 times/month	22	132	16	117	20	139	16	110
Rarely/never	52	309	67	503	63	424	58	388

¹Significant difference by sex at p<0.05

²Significant difference by grade at p<0.05

3.0 Study Findings

About two-thirds of the boys and over half of the girls in this sample reported consuming salty snacks (66% boys, 60% girls), while about half of both sexes reported consuming french fries or other fried potatoes (56% boys, 48% girls) and candy or chocolate bars (52% boys, 55% girls) at least once a week. A significantly higher proportion of boys than girls reported daily consumption of french fries or other fried potatoes ($p=0.001$), pizza ($p<0.0001$) and game or wild meats ($p<0.001$). Girls were more likely to report that they rarely or never eat these foods. No significant differences were found by sex for frequency of consuming salty snacks, vitamin-minerals pills or candy or chocolate bars.

Significant differences were also found by grade with respect to consumption frequency of selected foods. A greater proportion of respondents in grade 7 versus grade 11 consumed salty snacks ($p=0.02$), french fries or other fried potatoes ($p=0.0003$), vitamin-mineral pills ($p=0.02$), and game or wild meats ($p<0.001$) on a daily basis. With the exception of game, students in grade 11 were more likely to report that they rarely or never consume these foods. The frequency of eating pizza and candy or chocolate bars did not differ significantly by grade.

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Table 3.4.19: Consumption frequency of selected food items, by Sport and Recreation Region (SRR)

How often do you eat the following foods?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
Salty snacks (like chips or cheesies)¹												
At least once/day	22	53	18	46	20	40	17	41	27	62	24	57
5-6 times/week	6	14	7	18	7	15	8	20	7	16	7	17
2-4 times/week	40	98	39	99	31	64	33	81	35	81	24	57
2-4 times/month	15	38	22	56	27	55	24	57	14	34	25	59
Rarely/never	17	41	14	36	15	31	18	44	17	40	20	47
French fries or other fried potatoes (wedges, poutine, etc.)¹												
At least once/day	8	20	7	17	5	11	6	15	12	28	9	20
5-6 times/week	9	21	6	16	6	12	7	18	11	25	8	18
2-4 times/week	43	106	36	89	41	83	32	75	38	89	28	66
2-4 times/month	28	68	33	83	36	73	40	94	23	55	35	80
Rarely/never	12	30	18	46	12	25	15	35	16	38	20	47
Vitamin-mineral pills (supplements/vitamins)¹												
At least once/day	20	44	22	50	16	30	24	54	22	47	25	51
5-6 times/week	3	7	5	12	2	4	5	11	2	4	4	9
2-4 times/week	8	18	10	21	4	8	7	16	5	10	4	9
2-4 times/month	6	14	7	15	17	31	8	18	6	14	10	20
Rarely/never	63	141	56	126	61	114	56	128	65	139	57	114
Pizza¹												
At least once/day	2	6	4	11	4	7	2	6	5	13	3	8
5-6 times/week	3	8	4	11	2	5	3	7	5	11	3	7
2-4 times/week	32	78	24	60	26	52	23	55	20	46	16	38
2-4 times/month	51	127	52	132	49	99	57	137	52	123	58	136
Rarely/never	12	29	16	41	19	39	15	37	18	42	20	45
Candy or chocolate bars¹												
At least once/day	12	30	9	22	10	21	9	23	16	38	11	25
5-6 times/week	15	36	11	29	11	23	12	28	6	15	10	23
2-4 times/week	34	84	33	84	31	62	27	64	35	82	29	66
2-4 times/month	23	57	32	82	29	59	31	75	23	53	32	73
Rarely/never	16	40	15	38	19	38	21	51	20	46	18	42
Game²												
At least once/day	3	6	2	6	1	1	2	5	5	12	1	3
5-6 times/week	2	5	4	10	4	7	3	6	3	7	5	10
2-4 times/week	10	24	17	40	13	26	19	44	18	41	14	30
2-4 times/month	15	35	20	47	20	40	18	42	21	47	17	38
Rarely/never	70	162	57	136	62	122	58	135	53	121	63	136

¹Significant difference by SRR at p<0.001

²Significant difference by SRR at p=0.02

3.0 Study Findings

Significant differences were found in terms of consumption frequency of selected food items by SRR. A higher proportion of students from South Shore reported daily consumption of salty snacks ($p < 0.0001$), french fries ($p < 0.0001$), pizza ($p < 0.0001$), candy or chocolate bars ($p < 0.0001$) and game ($p < 0.0001$). A quarter of the students from the Central region reported consuming vitamin and/or mineral supplements at least once a day, and this percentage was the highest of all the regions ($p < 0.001$).

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Table 3.4.20: Consumption frequency of selected meats

How often do you eat the following foods?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Sausages, wieners, cold cuts, bacon^{1,2}								
At least once/day	11	66	5	42	11	75	5	33
5-6 times/week	11	65	5	38	7	46	9	57
2-4 times/week	33	199	31	239	32	229	31	209
2-4 times/month	33	197	35	269	32	230	36	236
Rarely/never	12	73	24	186	18	130	19	129
Beef, ground beef/burger^{1,2}								
At least once/day	8	50	4	35	8	54	5	31
5-6 times/week	12	75	8	59	9	67	10	67
2-4 times/week	43	259	36	280	37	261	42	278
2-4 times/month	30	180	33	251	31	222	31	209
Rarely/never	7	41	19	144	15	107	12	78
Pork chops, pork roast (collapsed)^{1,2}								
At least once/week	14	84	7	58	13	93	7	49
2 or more times/month	73	438	72	553	69	492	76	499
Rarely/never	13	80	21	160	18	126	17	114
Ham^{1,2}								
At least once/day	5	27	2	18	5	34	2	11
5-6 times/week	7	44	2	13	4	24	5	33
2-4 times/week	18	108	15	116	17	123	15	101
2-4 times/month	45	268	44	339	42	301	47	306
Rarely/never	25	152	37	281	32	230	31	203
Wild meats and poultry (duck, goose, etc.) (collapsed)¹								
At least once/week	8	45	4	32	6	37	6	40
2 or more times/month	39	225	28	205	31	210	35	223
Rarely/never	53	304	68	500	63	421	59	383
Wild fish and seafood (collapsed)^{1,2}								
At least once/week	6	35	3	21	6	41	2	15
2 or more times/month	51	296	39	288	43	283	47	301
Rarely/never	43	250	58	425	51	342	51	333
Canned fish (salmon, tuna, sardines) (collapsed)								
At least once/week	5	26	2	15	4	24	3	17
2 or more times/month	32	177	32	234	31	203	32	208
Rarely/never	63	348	66	481	65	415	65	414
Frozen battered fish, fish sticks (collapsed)^{1,2}								
At least once/week	4	20	2	14	4	26	1	8
2 or more times/month	44	251	29	215	40	260	32	206
Rarely/never	52	293	69	508	56	367	67	434

¹Significant difference by sex at p<0.001

²Significant difference by grade at p<0.05

Note: some food categories were collapsed due to sparse data

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Significantly more boys than girls reported eating all of the meats, with the exception of canned fish, at least once a day and/or at least once a week, while more girls than boys reported that they rarely or never consume these foods. In terms of differences by grade, students in grade 7 were more likely to report daily consumption of sausages, wieners, cold cuts, bacon ($p < 0.001$), beef, ground beef/burger ($p = 0.016$), pork chops, pork roast ($p = 0.002$), ham ($p = 0.004$), wild fish and seafood ($p = 0.001$) and frozen battered fish or fish sticks ($p < 0.001$).

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Table 3.4.21: Consumption frequency of milk products and carbonated beverages

How often do you eat the following foods?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Chocolate milk²								
At least once/day	25	151	19	147	28	204	14	94
5-6 times/week	14	86	13	104	14	104	13	86
2-4 times/week	18	113	20	156	19	136	20	133
2-4 times/month	20	125	24	185	19	137	26	173
Rarely/never	23	139	24	190	20	151	27	178
Processed cheese slices, cheese spread^{1,2}								
At least once/day	15	91	10	78	17	117	8	42
5-6 times/week	12	72	10	78	11	81	10	69
2-4 times/week	26	151	22	170	25	172	23	149
2-4 times/month	22	126	25	191	19	135	28	182
Rarely/never	25	146	33	253	28	194	31	205
Cheese (mozzarella, cheddar, swiss, etc)²								
At least once/day	28	171	22	171	30	215	19	127
5-6 times/week	20	119	23	179	20	143	24	155
2-4 times/week	30	182	32	248	28	198	35	232
2-4 times/month	13	81	14	110	12	90	15	101
Rarely/never	9	47	9	66	10	69	7	44
Yogurt (plain or fruit)^{1,2}								
At least once/day	15	89	19	147	22	157	12	79
5-6 times/week	14	83	16	124	15	106	15	101
2-4 times/week	22	130	24	187	24	174	22	143
2-4 times/month	24	142	21	163	19	132	26	173
Rarely/never	25	147	20	157	20	145	24	159
Pop (non diet) (all types)^{1,2}								
At least once/day	24	141	14	113	20	143	17	111
5-6 times/week	16	94	10	74	12	88	12	80
2-4 times/week	26	155	20	154	22	159	23	150
2-4 times/month	18	108	21	165	23	162	17	111
Rarely/never	16	97	35	274	23	163	31	208
Diet pop (all types)²								
At least once/day	8	48	7	55	10	65	6	38
5-6 times/week	5	26	5	36	5	36	4	26
2-4 times/week	9	49	9	68	10	66	8	51
2-4 times/month	18	105	18	133	21	142	15	96
Rarely/never	60	340	61	461	54	369	67	432

¹Significant difference by sex at p<0.05

²Significant difference by grade at p<0.01

Significantly more boys than girls reported eating processed cheese or cheese slices (p=0.004) and drinking non diet pop (p<0.001) at least once a day, while more girls than boys reported daily consumption of yogurt (p=0.016). Grade 7 students were significantly more likely than grade 11 students to report daily consumption of all the listed foods.

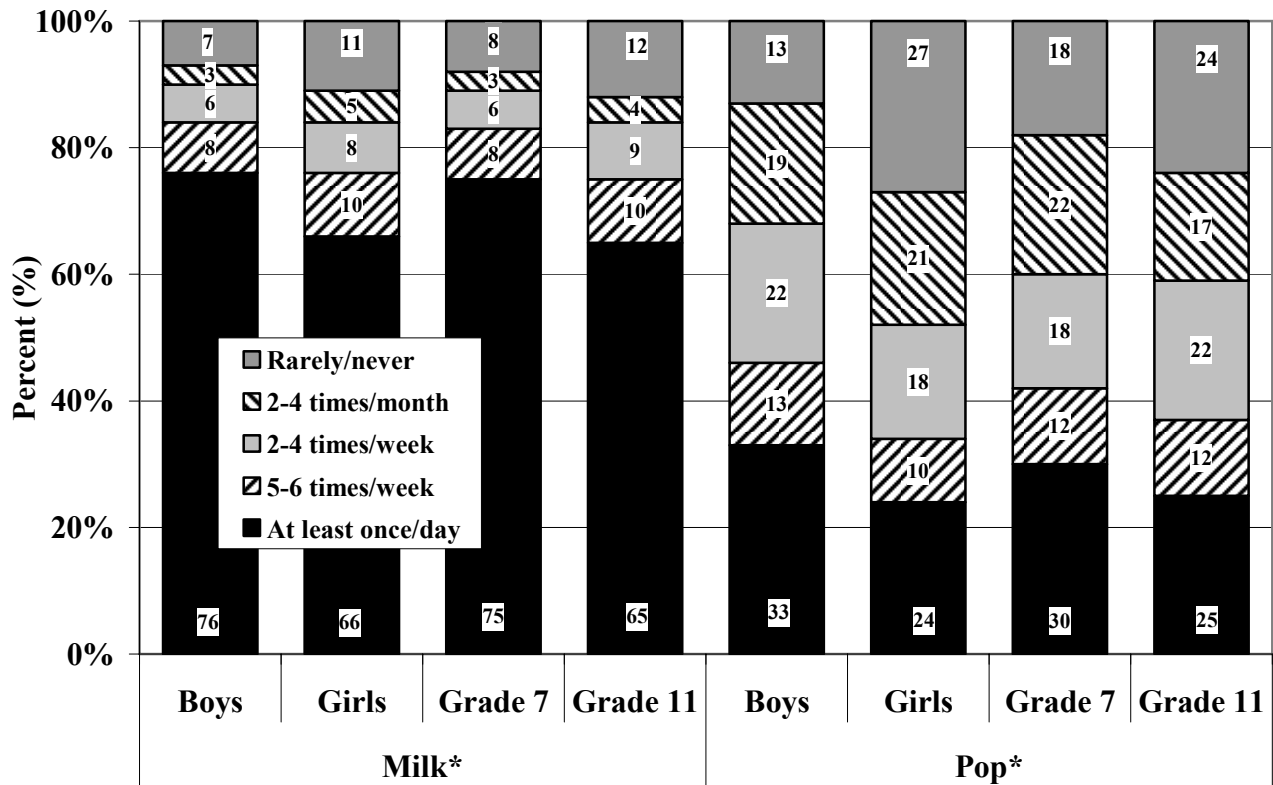


Figure 3.4.19: Consumption frequency of selected beverages, by sex and grade

*Significant difference by sex and grade at $p < 0.01$

NOTE: Milk includes both white and chocolate milk consumption

Students were asked about their milk and carbonated beverage consumption, and significant differences were found by grade and sex. Significantly more boys indicated that they drink milk ($p=0.0001$) and pop ($p<0.0001$) at least once a day. Over three quarters of the boys than girls said that they drink milk at least once a day, while only 66% of girls reported this. About a quarter of the girls said they drink pop on a daily basis, and about a third of the boys reported drinking pop at least once a day. In addition, over half of both boys (68%) and girls (53%) said they drink pop at least once a week. In terms of milk and pop consumption by grade, more grade 7 than grade 11 students reported daily consumption of milk ($p=0.001$) and pop ($p=0.0016$).

The mean per capita consumption of sweetened carbonated beverages of U.S. adolescents ranged from 11 ounces per day for 11 to 13 year old girls to 22 ounces for 14 to 17 year old boys, 17 to 30 ounces/day for consumers (French, Story et al., 2001). The wording of the current question precludes direct comparison. In the 2003 study of grade six to eight students from Peel region of Ontario, it was observed that more than 28% of boys and 14% of girls reported consuming cola-type pop at least once per day, (Hanning & Lambraki, unpublished observation,

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2003). A 2006 study of grade 6 to 8 students from Peel region found that mean cola consumption was 3.2 ± 4.2 times per week and non-cola 3.4 ± 4.5 times per week. When all sweetened beverages were accounted for (including fruit drinks, sport drinks and iced tea), 70% of students reported daily consumption of a sweetened beverage (McGoldrick 2006, unpublished).

There is significant concern about the high consumption of pop and other sweetened beverages by children and adolescents. This relates to concern that sweetened beverages may contribute to excess energy consumption, and hence weight gain (Troiano, Briefel et al., 2000; Bellisle & Rolland-Cachera, 2001). Ludwig and associates (2001) found a 60% increase in odds of obesity with each 355mL soft drink serving. In the large US NHANES survey, ~8% of adolescent energy intakes came from soft drinks (Troiano, Briefel et al., 2000). There is also an association between the increased prevalence of sweetened beverage consumption and decreased milk consumption (Nielsen & Popkin, 2004; Whiting, Healey et al., 2001).

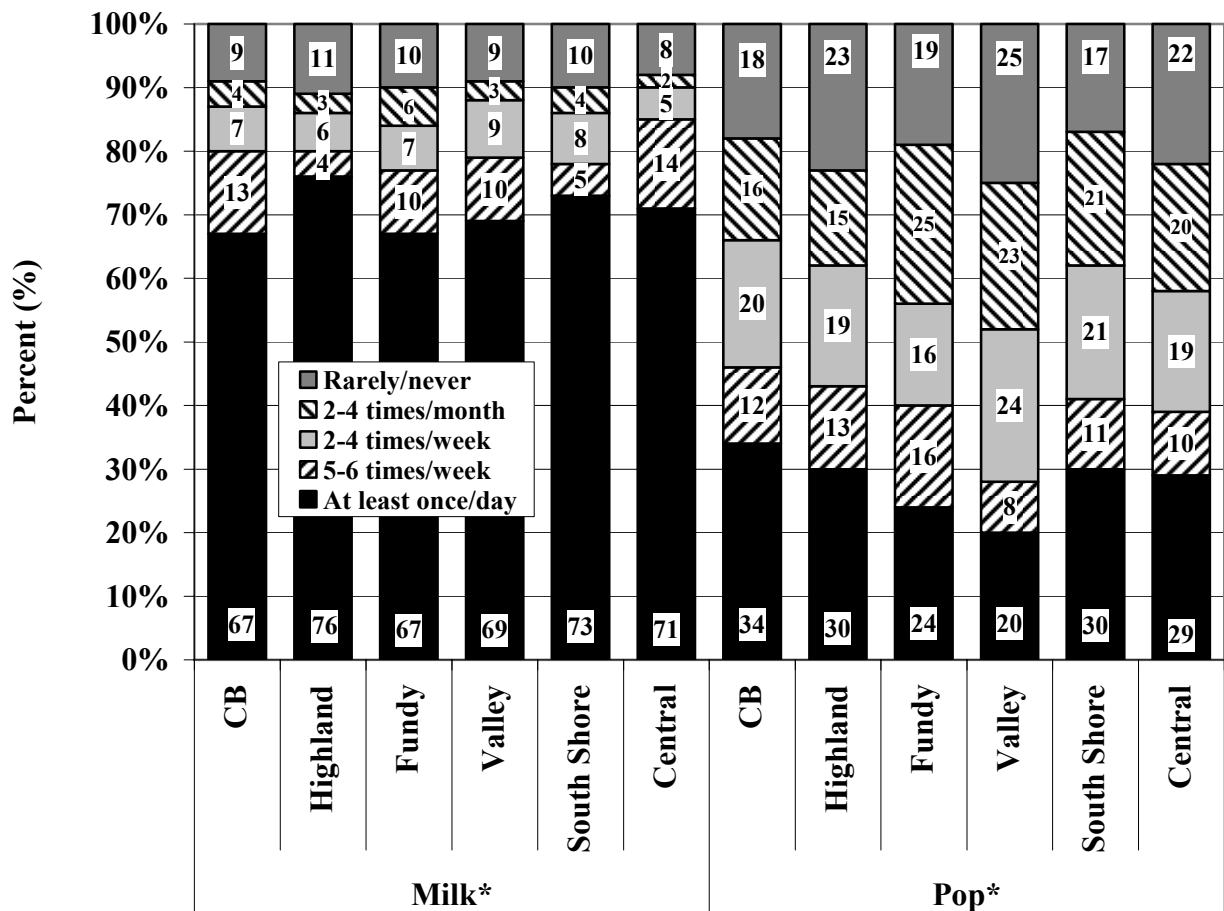


Figure 3.4.20: Consumption frequency of selected beverages, by Sport and Recreation Region (SRR)

*Significant difference by sex and grade at $p < 0.01$

NOTE: Milk includes both white and chocolate milk consumption

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Significant differences were found by SRR in terms of frequency of milk ($p=0.0023$) and pop ($p=0.01$) consumption. Students residing in the Highland region were the most likely to report that they drink milk at least once a day, but also that they rarely or never drink milk, compared to the other regions. About a third of the students from CB region reported consuming pop on a daily basis, which was a higher proportion than for the other regions, while one-quarter of the students from Valley region said they rarely or never consume pop.

Food Sources

Students were asked how often they ate foods prepared or sold from the school cafeteria, fast food or take out restaurants, other restaurants, vending machines, tuck shops/snack bars at the school or an arena, convenience stores and friend/relative's home.

Table 3.4.22: Location of daily consumption of foods prepared away from home

Location	n	At least once/day	Less often
School cafeteria (including pizza days and other special meals)	1398	13%	87%
Fast food/take out restaurant	1397	2%	98%
Other restaurant	1377	2%	98%
Vending machines	1362	3%	97%
Tuck shop/snack bar at school or an arena	1387	4%	96%
Convenience store	1382	4%	96%
At a friend/relative's home	1396	4%	96%

Thirteen percent of the students who responded to the question reported eating food prepared at the school cafeteria at least once a day. In addition, 4% of the respondents reported that they eat foods from a tuck shop or snack bar, convenience store or foods prepared at a friend or relative's home on a daily basis. Fast food restaurants, other restaurants and vending machines were frequented less often on a daily basis.

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Table 3.4.23: Frequency of eating meals or snack prepared away from home, by sex and grade

How often do you eat meals or snacks prepared away from home?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
School cafeteria (including pizza days and other special meals)								
At least once/week	58	354	56	441	59	419	55	376
Once/month	11	68	13	102	12	84	12	86
Rarely/never	31	191	31	242	29	208	33	225
Fast food/take out restaurant ²								
At least once/week	40	244	34	267	30	217	43	294
Once/month	39	240	42	327	45	325	36	242
Rarely/never	21	128	24	191	25	175	21	144
Other restaurant ¹								
At least once/week	26	157	17	134	20	143	22	148
Once/month	47	280	50	388	49	343	48	325
Rarely/never	27	164	33	254	31	220	30	198
Vending machines ¹								
At least once/week	31	181	20	150	25	176	23	155
Once/month	19	112	16	126	18	122	18	116
Rarely/never	50	299	64	494	57	398	59	395
Tuck shop/snack bar at school or an arena ^{1,2}								
At least once/week	39	237	28	217	40	281	26	173
Once/month	23	143	25	198	23	166	26	175
Rarely/never	38	229	47	363	37	266	48	326
Convenience store ¹								
At least once/week	50	302	39	303	42	298	46	307
Once/month	28	173	30	233	29	207	29	199
Rarely/never	22	132	31	239	29	203	25	168
At a friend/relative's home ²								
At least once/week	55	332	53	416	50	359	58	389
Once/month	26	157	30	237	29	210	27	184
Rarely/never	19	118	17	136	21	152	15	102

¹Significant difference by sex at $p \leq 0.001$

²Significant difference by sex at $p < 0.01$

Significant differences were found in the frequency with which boys and girls consumed meals and snacks prepared away from home. Boys were more likely than girls to report eating meals and snacks purchased from other (non-fast food) restaurants ($p=0.001$), vending machines ($p < 0.0001$), tuck shops/snacks bars ($p < 0.001$) and convenience stores ($p < 0.001$) at least once or more per week compared to girls. Girls were more likely to report that they rarely or never consume foods prepared or purchased at any of the venues listed compared to boys, with the exception of eating at a friend or relative's home. This is consistent with the CCHS cycle 2.2 (2004) data which found that more 9 to 13 year old boys than girls had consumed food prepared at fast food outlets (Garriguet, 2006).

Significant differences were found between students in grades 7 and grade 11 in terms of eating foods prepared outside the home. Grade 11 students were significantly more likely to

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consume fast food or take out at least once a week ($p < 0.001$), while grade 7 students were more likely to report consuming these foods once a month. More students in grade 7 reported eating foods from snack bars at least once a week ($p < 0.001$), while grade 11 students consumed these foods less often. Significant differences also existed in the frequency of eating at a friend or relative's home, with more grade 11 students reporting once a week or more, compared to grade 7 students ($p = 0.003$).

Table 3.4.24: Frequency of eating meals or snack prepared away from home, by Sport and Recreation Region (SRR)

How often do you eat meals or snacks prepared away from home?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
School cafeteria (including pizza days and other special meals) ¹												
At least once/week	49	119	54	132	63	131	62	148	67	158	47	107
Once/month	11	27	9	23	13	28	14	34	13	30	12	28
Rarely/never	40	96	37	91	24	49	24	58	20	47	41	92
Fast food/take out restaurant ²												
At least once/week	46	113	34	83	27	56	32	76	45	102	35	81
Once/month	37	90	43	107	50	102	41	99	36	83	37	86
Rarely/never	17	42	23	57	23	47	27	65	19	44	28	64
Other restaurant												
At least once/week	30	73	17	42	19	39	18	42	24	54	18	41
Once/month	43	104	50	122	54	109	47	112	45	102	53	119
Rarely/never	27	64	33	81	27	55	35	83	31	69	29	66
Vending machines ¹												
At least once/week	27	66	17	40	24	47	23	54	27	60	29	64
Once/month	17	41	18	44	15	29	20	47	16	36	18	41
Rarely/never	56	134	65	158	62	123	57	134	57	125	53	119
Tuck shop/snack bar at school or an arena ²												
At least once/week	43	105	30	75	23	48	26	62	38	86	34	78
Once/month	27	65	29	73	28	56	28	67	17	39	18	41
Rarely/never	30	72	40	100	49	100	46	108	45	101	48	111
Convenience store ¹												
At least once/week	58	142	40	98	43	88	41	99	43	96	36	82
Once/month	23	57	36	88	27	55	28	66	33	72	29	68
Rarely/never	19	46	24	58	30	60	31	73	24	53	35	81
At a friend/relative's home												
At least once/week	56	138	47	116	54	109	54	128	52	117	59	140
Once/month	25	63	34	84	28	57	30	71	27	62	24	57
Rarely/never	19	46	19	48	18	36	16	38	21	47	17	39

¹Significant difference by SRR at $p < 0.05$

²Significant difference by SRR at $p < 0.0001$

With respect to eating foods prepared outside the home, significant differences were found by SRR for the frequency of food prepared at the school cafeteria ($p = 0.01$), fast food restaurants ($p < 0.0001$), vending machines ($p = 0.035$), tuck shop or snack bars ($p < 0.0001$) and

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food from convenience stores ($p < 0.001$). Students from CB were significantly more likely to report eating foods prepared at fast food restaurants, vending machines, snack bars and convenience stores at least once a week compared to all other regions. In terms of eating foods prepared at the school cafeteria, South Shore region students had the highest proportion reporting weekly consumption.

Table 3.4.25: Locations where food consumed was purchased, by sex and grade

Where did you or your family buy the food you ate yesterday?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Breakfast²								
Grocery store/market	82	507	78	609	76	624	73	492
Restaurant/cafeteria	3	15	2	16	1	7	4	24
Convenience store/vending machine/other	3	20	3	23	4	31	2	12
Did not eat	12	75	17	134	9	66	21	143
Morning snack²								
Grocery store/market	52	275	45	320	59	389	35	206
Restaurant/cafeteria	9	47	10	71	7	44	12	74
Convenience store/vending machine/other	5	27	5	34	6	39	4	22
Did not eat	34	177	40	291	28	183	29	285
Lunch²								
Grocery store/market	61	378	62	483	68	499	54	362
Restaurant/cafeteria	29	181	26	208	23	166	33	223
Convenience store/vending machine/other	6	38	5	41	6	46	5	33
Did not eat	4	26	7	52	3	24	8	54
Afternoon snacks²								
Grocery store/market	65	352	60	438	70	462	54	328
Restaurant/cafeteria	3	15	3	23	3	19	3	19
Convenience store/vending machine/other	10	51	8	59	8	55	9	55
Did not eat	22	121	29	206	19	121	34	206
Dinner^{1,2}								
Grocery store/market	85	534	82	636	88	641	78	529
Restaurant/cafeteria	9	56	10	75	6	43	13	88
Convenience store/vending machine/other	5	31	4	35	5	35	5	31
Did not eat	1	6	4	34	1	10	4	30
Evening snacks^{1,2}								
Grocery store/market	73	420	66	490	72	493	65	417
Restaurant/cafeteria	3	16	4	26	2	10	5	32
Convenience store/vending machine/other	12	70	9	70	11	76	10	64
Did not eat	12	70	21	156	15	101	20	125

¹Significant difference by sex at $p < 0.01$

²Significant difference by grade at $p < 0.001$

Boys and girls reported significantly different locations where they or their family had bought the food they ate for dinner ($p = 0.009$) and evening snacks ($p < 0.001$) on the day before completing the web-based survey. Boys were significantly more likely to report eating foods for

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dinner and evening snacks that had been purchased from a grocery store, while girls were more likely to report not eating either of these meals.

In terms of the locations where students in grade 7 and 11 purchased the food they ate for breakfast, lunch and dinner, significant differences were found for all meals and snacks ($p < 0.001$). Grade 7 students were more likely to report that they, or their family, had bought foods for all meals and snacks at a grocery store or market, while grade 11 students were more likely to report eating foods purchased from restaurants or a cafeteria and more grade 11 students reported skipping meals and snacks.

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Table 3.4.26: Locations where food consumed was purchased, by Sport and Recreation Region (SRR) in the province of Nova Scotia

Where did you or your family buy the food you ate yesterday?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
Breakfast												
Grocery store/market	75	184	81	207	79	160	80	190	83	186	80	189
Restaurant/cafeteria	3	8	2	6	1	2	3	7	2	4	2	4
Convenience store/vending machine/other	4	9	3	8	6	12	1	3	2	4	3	7
Did not eat	18	43	14	36	14	29	16	37	13	29	15	35
Morning snack²												
Grocery store/market	36	72	52	124	41	74	58	124	49	97	51	104
Restaurant/cafeteria	7	14	10	25	11	20	12	25	12	23	5	11
Convenience store/vending machine/other	6	12	7	17	4	8	2	5	5	11	4	8
Did not eat	51	102	31	75	44	81	28	61	34	68	40	81
Lunch¹												
Grocery store/market	57	140	68	174	53	108	62	148	54	123	72	168
Restaurant/cafeteria	33	81	21	54	32	65	27	65	35	80	19	44
Convenience store/vending machine/other	7	18	5	13	8	17	4	10	4	9	5	12
Did not eat	3	6	6	15	7	15	7	16	7	16	4	10
Afternoon snacks¹												
Grocery store/market	51	101	67	161	59	109	64	139	65	136	67	144
Restaurant/cafeteria	4	8	2	5	3	5	2	4	6	12	2	4
Convenience store/vending machine/other	9	18	9	21	15	28	5	10	7	15	8	18
Did not eat	36	73	22	54	23	42	29	64	22	45	23	49
<i>table continued on next page...</i>												

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Where did you or your family buy the food you ate yesterday?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
Dinner												
Grocery store/market	80	197	82	211	82	166	85	202	86	195	85	199
Restaurant/cafeteria	12	29	11	28	8	17	8	18	8	18	9	21
Convenience store/vending machine/other	4	10	7	17	6	13	5	13	3	8	2	5
Did not eat	4	10	0	1	4	8	2	6	3	6	4	9
Evening snacks¹												
Grocery store/market	60	138	71	175	66	124	71	158	73	157	72	158
Restaurant/cafeteria	8	17	3	8	2	3	2	4	2	4	3	6
Convenience store/vending machine/other	14	32	11	28	12	22	8	18	9	21	9	19
Did not eat	18	41	15	36	20	38	19	41	16	34	16	36

¹Significant difference by SRR at $p < 0.05$

²Significant difference by SRR at $p < 0.0001$

Significant differences were found by SRR in response to the question on where food consumed was purchased for morning snack ($p < 0.0001$), lunch ($p = 0.0018$), afternoon snack ($p = 0.0002$), and evening snack ($p = 0.027$). A great proportion of students from Valley and South Shore regions purchased their morning snack from a restaurant or cafeteria, while students from South Shore and CB were more likely to report that their lunch had been purchased from a restaurant or school cafeteria. More students from Fundy region ate foods purchased from a convenience or vending machine for lunch and afternoon snack, compared to the other regions. In terms of where evening snack were purchased, students from CB were the most likely to report eating a snack purchased from a restaurant or cafeteria and from a convenience store or vending machine.

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Food Preparation

Students were asked who prepared the food they ate yesterday, as well as how often they are involved in preparing their own meals.

Table 3.4.27: Preparation (by whom) of food consumed yesterday, by sex and grade

Who prepared the food that you ate yesterday?	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
Breakfast^{1,2}								
Myself	56	344	55	434	52	385	58	393
Family	29	177	24	190	36	261	16	106
Restaurant/cafeteria	1	7	2	16	1	5	3	18
Other/did not eat	14	89	19	153	11	83	23	159
Morning snack²								
Myself	36	185	32	231	38	241	30	175
Family	15	78	13	91	20	131	6	38
Restaurant/cafeteria	7	39	8	57	5	34	10	62
Other/did not eat	42	219	47	338	37	239	54	318
Lunch²								
Myself	27	168	28	223	26	189	30	202
Family	35	221	34	268	43	314	26	175
Restaurant/cafeteria	27	169	27	210	21	158	32	221
Other/did not eat	11	67	11	89	10	76	12	80
Afternoon snacks²								
Myself	62	334	56	405	63	416	53	323
Family	8	46	8	56	11	73	5	29
Restaurant/cafeteria	3	15	2	17	2	14	3	18
Other/did not eat	27	148	34	247	24	157	39	238
Dinner^{1,2}								
Myself	11	68	12	96	8	63	15	101
Family	79	499	71	561	84	620	64	440
Restaurant/cafeteria	6	41	9	69	4	29	12	81
Other/did not eat	4	26	8	65	4	28	9	63
Evening snacks^{1,2}								
Myself	72	423	64	481	68	475	66	429
Family	9	56	7	56	11	80	5	32
Restaurant/cafeteria	1	6	3	24	1	6	4	24
Other/did not eat	18	106	26	193	20	137	25	162

¹Significant difference by sex at $p < 0.01$

²Significant difference by grade at $p < 0.0001$

Students were asked to report on who had prepared the food they ate yesterday. Significant differences were found between boys and girls in terms of who prepared breakfast ($p = 0.022$), dinner ($p = 0.016$) and evening snacks ($p < 0.0001$), and differences were found for all meals and snacks by grade ($p < 0.0001$). More girls reported they had skipped breakfast, dinner

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and evening snacks, or that these meals were prepared by a restaurant or cafeteria, while more boys reported that someone in their family had prepared their meals.

In terms of significant differences by grade, more grade 11 students reported skipping meals or that their meals were prepared in a restaurant or cafeteria, while significantly more grade 7 students reported that someone in their family had prepared their meals. It is interesting to note that one-third (32%) of the grade 11 students reported that their lunch was made by a restaurant or cafeteria, compared to 21% of grade 7 students.

Who prepared the meal (Boutelle, Lytle et al., 2001; Neumark-Sztainer, Story et al., 1999; Neumark-Sztainer, Story et al., 2000); and the impact of convenience (Neumark-Sztainer, Story et al., 1999) and take out food (Clauson, 1999; Lin, Gurthrie et al., 1999a; Lin, Gurthrie et al., 1999b) may all influence diet quality of students. For example, eating away from home has been associated with reduced calcium intakes in adolescents and preadolescents (Read, Novotny, et al., 2002).

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Table 3.4.28: Preparation (by whom) of food consumed yesterday, by Sport and Recreation Region (SRR)

Who prepared the food that you ate yesterday?	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
Breakfast²												
Myself	43	104	54	139	59	122	58	138	58	133	60	142
Family	36	87	28	72	21	44	23	54	25	57	22	53
Restaurant/cafeteria	3	7	1	4	2	3	2	6	1	2	1	1
Other/did not eat	18	44	17	44	18	37	17	39	16	37	17	41
Morning snack²												
Myself	26	51	42	98	27	50	39	82	31	63	35	72
Family	11	21	13	31	15	27	14	29	16	33	13	28
Restaurant/cafeteria	4	8	8	20	8	15	11	23	10	21	4	9
Other/did not eat	59	115	37	88	50	91	36	76	43	87	48	100
Lunch²												
Myself	16	40	35	91	22	46	29	70	24	56	37	88
Family	42	101	36	92	34	69	31	75	28	66	36	86
Restaurant/cafeteria	35	85	20	52	31	64	27	64	32	74	17	40
Other/did not eat	7	16	9	24	13	26	13	31	16	36	10	23
Afternoon snacks¹												
Myself	50	97	58	139	58	109	55	120	68	142	61	132
Family	8	16	12	28	6	11	8	18	5	11	8	18
Restaurant/cafeteria	3	6	1	4	3	5	4	8	3	7	1	2
Other/did not eat	39	75	29	69	33	62	33	73	24	50	30	66
Dinner¹												
Myself	12	29	13	34	15	31	9	21	14	32	7	17
Family	72	176	73	188	69	143	76	183	76	179	80	191
Restaurant/cafeteria	9	21	9	23	8	16	8	20	5	12	8	18
Other/did not eat	7	18	5	14	8	16	7	18	5	12	5	13
Evening snacks¹												
Myself	62	139	68	169	64	125	68	157	71	158	69	156
Family	10	22	9	22	8	16	6	13	9	19	9	20
Restaurant/cafeteria	6	14	2	5	2	3	1	2	2	4	1	2
Other/did not eat	22	50	21	53	26	50	25	57	18	40	21	49

¹Significant difference by SRR at p<0.05

²Significant difference by SRR at p<0.0001

Significant differences were seen between SRRs in terms of who prepared all meals and snacks. More students from Central region prepared their own breakfast, while a greater proportion of students from CB region had their parents prepare breakfast (p<0.0001). Students attending schools in the Valley region were more likely to prepare their own morning snack, or purchased it from a restaurant or cafeteria (p<0.0001). In terms of who prepared lunch, students from CB were the most likely to report that their parents or a restaurant or cafeteria had prepared lunch (p<0.001). A greater proportion of students residing in the South Shore region reported that they had prepared their own afternoon (p=0.022) and evening snacks (p=0.008). Dinner

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preparation was most often done by family, but 15% of the Fundy students prepared their own dinner, and 9% of students from Highland region reported that a restaurant or cafeteria had prepared dinner on the day prior to participation in the web-based survey.

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Confidence to Eat Healthy Foods

Students were asked to report on their confidence to choose to eat healthy foods in different situations. The participants' answers are presented by sex and grade.

Table 3.4.29: Confidence to eat healthy foods, by sex and grade

How sure are you that you could choose to eat healthy food when you are eating... (on a scale from 1 to 6)	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
... at home with your family?¹								
Not sure (1 or 2)	12	74	8	63	12	89	7	48
Somewhat sure (3 or 4)	29	187	29	231	29	217	29	201
Very sure (5 or 6)	59	376	63	501	59	438	64	439
... at school with your friends?								
Not sure (1 or 2)	25	155	20	159	25	184	19	130
Somewhat sure (3 or 4)	50	312	50	393	49	359	51	346
Very sure (5 or 6)	25	161	30	236	26	188	30	209
... during social times with your friends?¹								
Not sure (1 or 2)	35	221	29	231	35	257	28	195
Somewhat sure (3 or 4)	47	298	52	408	46	339	54	367
Very sure (5 or 6)	18	110	19	148	19	136	18	122
... alone?¹								
Not sure (1 or 2)	25	158	20	154	28	200	16	112
Somewhat sure (3 or 4)	34	214	35	272	31	228	38	258
Very sure (5 or 6)	41	254	45	354	41	294	46	314

¹Significant difference by grade at $p < 0.01$

While no significant differences were found by sex in terms of their confidence to choose to eat healthy foods when eating in different situations, significant differences were found by grade with regards to confidence choosing healthy foods at home with family ($p=0.009$), during social times with friends ($p=0.029$) and alone ($p<0.001$). For the most part, grade 11 students expressed more confidence to eat healthy foods compared to grade 7 students, who were more likely to be unsure they could eat healthy foods in different situations. A third of the grade 7 students said they were unsure they could eat healthy foods during social times with friends.

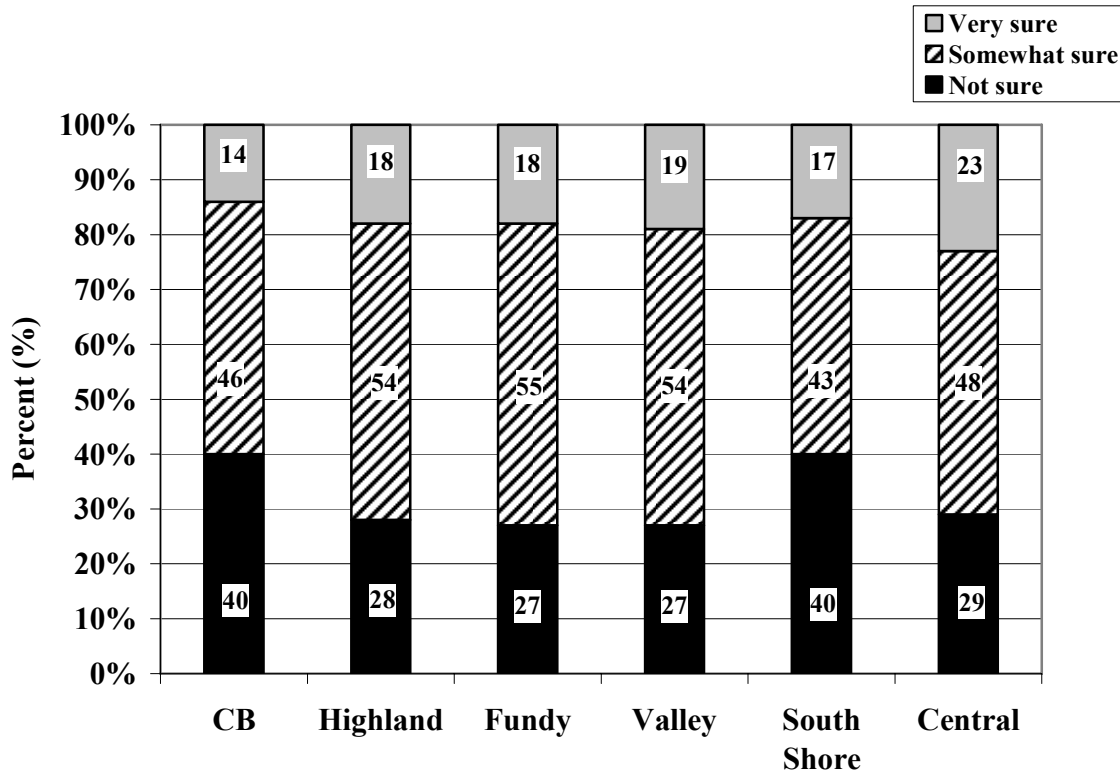


Figure 3.4.21: Confidence to eat healthy foods, by Sport and Recreation Region (SRR)
 *Significant difference by SRR at $p=0.005$

In terms of SRRs, the only significant difference was found in students' confidence to choose to eat healthy foods during social times with friends ($p=0.005$, see Table 3.4.29). A greater proportion of students from CB and South Shore indicated that they were not sure they could choose to eat healthy foods (40%) compared with the other regions. Valley region had the greatest proportion of students who reported they were very sure they could choose to eat healthy foods during social times with friends (19%).

3.4.7 Trusted Sources of Food and Health Information

Table 3.4.30: Trusted sources of food and health information, by sex and grade

Who would you like to teach you about food and health information? Choose your top three.	Boys		Girls		Grade 7		Grade 11	
	%	n	%	n	%	n	%	n
I would want... the most^{1,2}								
Family (parents, grandparents, sibling) or best friend	42	214	46	329	54	323	36	220
Health professional (doctor, dietitian, nurse)	23	115	27	198	17	103	34	210
Teacher/coach	9	45	8	58	6	38	10	65
Printed media (food labels, magazines, books, newspaper, health pamphlets)	8	39	8	56	8	48	8	47
TV/radio/internet	13	65	7	55	11	68	8	52
Other (naturopath, health food store staff)/none	5	26	4	26	4	26	4	26
I would want... next most²								
Family (parents, grandparents, sibling) or best friend	33	166	37	268	43	259	28	175
Health professional (doctor, dietitian, nurse)	22	111	22	157	19	113	25	155
Teacher/coach	14	68	10	72	9	54	14	86
Printed media (food labels, magazines, books, newspaper, health pamphlets)	13	63	14	102	12	74	15	91
TV/radio/internet	13	67	11	78	12	69	12	76
Other (naturopath, health food store staff)/none	5	25	6	42	5	33	6	34
I would want... third most^{1,2}								
Family (parents, grandparents, sibling) or best friend	26	129	28	199	28	164	27	164
Health professional (doctor, dietitian, nurse)	17	84	21	148	20	117	19	115
Teacher/coach	13	64	12	82	11	64	13	82
Printed media (food labels, magazines, books, newspapers, health pamphlets)	14	70	20	146	15	93	20	123
TV/radio/internet	18	89	10	71	14	85	12	75
Other (naturopath, health food store staff)/none	12	56	9	68	12	72	9	52

¹Significant difference by sex at p<0.05²Significant difference by grade at p<0.05

Students were asked to choose, from a list of potential sources, their top three choices of who they would like to teach them about food and health information. In students' first (p=0.024) and third (p<0.001) choices, significant differences were found by sex and grade, when categories were collapsed. Among boys and girls, almost half of the students reported they would want someone in their family (parents, grandparent, sibling) or their best friend to teach them about food and health information. More girls than boys indicated they would want a health professional (doctor, dietitian, nurse) to teach them, while more boys said they would like to learn from TV, radio or the internet. In terms of their third choice for health and food

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information, more girls chose printed media, such as food labels, magazines, books, newspapers or health pamphlets, while more boys continued to chose TV/radio/internet.

Significant differences were also seen in the first ($p<0.001$), second ($p<0.001$) and third ($p=0.041$) choices between grades 7 and 11 students. Respondents in grade 7 were significantly more likely to report wanting to learn from someone in their family, especially their parents, compared to grade 11 students, for all three choices. More grade 11 students reported that they would like a health professional, most often a dietitian, to teach them about food and health information as their first and second choices.

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Table 3.4.31: Trusted sources of food and health information, by Sport and Recreation Region (SRR)

Who would you like to teach you about food and health information? Choose your top three.	CB		Highland		Fundy		Valley		South Shore		Central	
	%	n	%	n	%	n	%	n	%	n	%	n
I would want... the most¹												
Family (parents, grandparents, sibling) or best friend	40	87	46	105	46	82	45	89	42	82	47	98
Health professional (doctor, dietitian, nurse)	29	63	27	61	21	37	28	55	26	51	22	46
Teacher/coach	8	18	6	13	13	23	10	20	2	4	12	25
Printed media (food labels, magazines, books, newspaper, health pamphlets)	13	28	6	13	8	14	7	14	8	16	5	10
TV/radio/internet	7	16	12	27	9	16	7	13	15	30	9	18
Other (naturopath, health food store staff)/none	3	6	3	8	3	6	3	7	7	14	5	11
I would want... next most¹												
Family (parents, grandparents, sibling) or best friend	38	82	32	71	40	71	34	68	29	56	42	86
Health professional (doctor, dietitian, nurse)	21	45	28	63	16	28	27	54	20	40	18	38
Teacher/coach	9	20	9	21	12	22	14	27	12	24	13	26
Printed media (food labels, magazines, books, newspaper, health pamphlets)	12	27	14	30	12	21	14	27	17	34	13	26
TV/radio/internet	15	32	12	27	14	25	9	17	14	27	8	17
Other (naturopath, health food store staff)/none	5	12	5	12	6	10	2	4	8	16	6	13
I would want... third most¹												
Family (parents, grandparents, sibling) or best friend	25	54	29	66	29	49	31	61	26	51	23	47
Health professional (doctor, dietitian, nurse)	20	44	18	40	16	28	18	34	19	37	25	49
Teacher/coach	9	19	11	25	15	25	15	29	11	22	13	26
Printed media (food labels, magazines, books, newspapers, health pamphlets)	21	45	18	40	14	24	14	28	21	41	19	38
TV/radio/internet	11	25	16	35	14	24	13	26	12	23	13	27
Other (naturopath, health food store staff)/none	14	30	8	19	12	21	9	18	11	22	7	14

¹Significant difference by SRR at p<0.0001

In terms of who students would like to teach them about food and health information, significant differences were found by SRR in students' first, second and third choices

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($p < 0.0001$). A greater proportion of students from the Central region reported that they would like someone in their family to teach them about food and health information. Students from CB were more likely to report that they would like to learn from a health professional or the printed media, while 15% of students from South Shore indicated they would like to learn from TV, radio or the internet. In terms of a second choice, more students from Highland and Valley regions reported that they would like a health professional to teach about food and health information. South Shore students were the most likely of the regions to report printed media as a preferred third choice for learning about food and health information, while more students from Central said they'd like to learn from a health professional, and Highland students were more likely to choose TV, radio or the internet as a source for food and health information.

4.0 Recommendations

Comprehensive programming through collaborative project and policy planning between all levels of government and across government departments as well as community organizations is required to ensure optimal health enhancing physical activity and dietary intake of Nova Scotia children and youth. Recommendations shaped by this research report are both general and specific to the key settings of home, school, community and health care. The recommendations for interventions are shaped by both published research evidence and community experience.

4.1 General Recommendations

- **Continue support of future health monitoring.** Use the PACY initiative to identify trends in food and nutrition and physical activity related behaviours of Nova Scotia children and youth. This will tell us if we are making progress on a population level.
- **Employ ongoing PACY data in program design and evaluation.** Monitor success of health promotion initiatives for Nova Scotia youth such as the *Active Kids Healthy Kids (AKHK)* strategy and the *Health Promoting Schools* strategy. The implications of regional differences in food availability and access (e.g., breakfast, snack and lunch programs) on nutritional well-being of youth should be considered. The findings from this study are valuable sources of information for provincial, regional and local healthy living strategies to provide curricular and environmental supports in the home, in schools, and in communities for both physical activity and healthy eating.
- **Continue to resource and support the implementation of the provincial Healthy Eating Nova Scotia strategy.** Key components include implementation and monitoring of the *Food and Nutrition Policy for Nova Scotia Public Schools*, and promotion of healthy eating in recreation facilities and other places children and youth play, and promotion of fruit and vegetable consumption.
- **Expansion of breakfast programs** beyond elementary aged children should also be considered as part of the *Learning for Life II: Brighter Futures Together* initiative.
- **Develop targeted health promotion messaging.** Use the findings from this research project for major population groups (i.e., youth, educators, parents, community agencies), as well as specific messaging for population subgroups, (e.g., sex and age youth subgroups). Health promotion messaging includes but is not limited to social marketing campaigns. Messages can be directed to children and youth but also to key influencers such as parents, teachers, and elected officials.
- **Implement social marketing campaigns and resources to educate and encourage parents and children.** Parents and children need to make informed decisions about a healthy balance of physical activity, screen time, other sedentary behaviours and healthy eating. Food insecurity concerns within the province should be a consideration in social marketing.

- **Support strategies to improve calcium, folate and fibre intakes of young females.** This will reduce health risks throughout adulthood.
- **Support incorporation of healthy weight messages for young females.** This will reduce negative health impacts of long-term weight-loss dieting.
- **Support incorporation of healthy weight messages for young males.** This will reduce negative health impacts of unhealthy weight gain practices.
- **Develop and support province-wide programs to address problems of meal skipping by Nova Scotia youth.** Healthy eating messages, including the importance of not skipping meals and following *Canada's Food Guide to Healthy Eating*, should be incorporated and emphasized in school curriculum and in areas where children and youth play (e.g. recreation facilities). The importance of breakfast in particular should be emphasized.

4.2 Recommendations for Settings

4.2.1 Home

- **Health promotion messaging and campaigns should encourage parents and caregivers to continue supporting their children into adolescence.** Mothers and fathers are consistently seen as positive role models for physical activity and healthy eating. They should therefore be encouraged to use this influence to a positive advantage in facilitating their children's active involvement in decisions related to physical activity and healthy eating. In particular, this encouragement should not be reduced or seen as less important as their children get older. The data clearly shows that encouragement by parents for older children was less frequent than for younger ones.
- **Facilitate more parental education and involvement in physical activity as well as a supportive family environment to reinforce the message at home.** Encourage parents to reduce excessive time on activities that are sedentary such as screen time. This can have the potential of increasing physical activity, reducing food intake while watching TV and reducing exposure to advertising which encourages unhealthy eating behaviours.

4.2.2 School

- **Educate and encourage high school students to minimally increase their intensity of physical activity (i.e., walking at approximately 5.5 kph).** This study group accumulated a substantial amount of light activity, and it is estimated that a substantial number of grade 11 participants could then achieve the Nova Scotia criteria.
- **Ensure consistent access to youth breakfast programs throughout all school grades throughout Nova Scotia.** Students need a healthy breakfast in order to be ready to learn. Differences in access to breakfast programs were noted across Nova Scotia. Access to breakfast programs was lower in grade 11 compared to grade 7, and more grade 7 students reported eating breakfast than grade 11 students.
- **Use school and community resources to provide active adult and adolescent role models within the school and assist girls to participate in physical activities outside of PE classes that are of high interest to them.** This should lead to more social supports necessary to promote an activity friendly environment for girls, since they were less active than boys in all grades. An example activity of high interest to girls is the new technology, Dance Dance Revolution.
- **Establish mandated 'time to learn', explicit to Health Education (grades P-6) and Health/Personal Development and Relationships (grades 7-9).** Consistency across the province needs to occur whereby all students receive the recommended 50-60 mins/week of explicit 'time to learn' in Health Education and 8-10% time allotment (20-30mins

daily) for Health/Personal Development and Relationships (PDR). It is within this discipline that curriculum outcomes specific to healthy eating, physical activity and making informed healthy living decisions reside.

- **Create increased course options within the high school physical education discipline that will both educate and engage youth in the benefits of daily physical activity.** Currently the only graduation requirement for physical education is a half-credit course, Physically Active Lifestyle 11 (PAL). The Department of Education plans to add an additional required credit in Physical Education. This is a good start and is needed given the extremely poor results of grade 11 students.
- **Provide funding to school boards to increase the number of physical education classes per week in both upper elementary (beginning in grades 3-6) and in junior high.** It is recommended that all grade levels participate in mandatory physical education for 45 minutes per day. These classes should be taught by specialized physical education teachers. Adding daily classes would significantly contribute to increasing activity levels in all grades.
- **Provide increased support and professional development to Physical Education teachers/school boards.** Physical education programs need to ensure that a wide-range of learning experiences are offered which enhance self-efficacy, behavioral skills and increase in-class participation in moderate to vigorous physical activity. Research in physical education says that there is not enough actual physical activity going on within the class. The physical education program should ensure students are informed about and connected to physical activity opportunities at home and in the community.
- **Integrate physical activity and healthy eating into other subject areas in school.** It would be strategic to look beyond traditional health curriculum areas such as PE, Health, PDR, and Family Studies. There are numerous examples in practice and in the literature that show how physical activity and healthy eating can be used effectively in courses such as mathematics, language arts, and science.
- **Incorporate active modes of transportation into school field trips.** It can be for all or a portion of the trip.
- **Facilitation by educators and planners of active transportation opportunities and physical environment for students.** The percentage of students walking to and from school has decreased since PACY 2001.
- **Support healthy eating policies for all schools through;**
 - a. Encouragement and support of development of healthy menu items within the school food environments
 - b. Ensuring required infrastructure is in place for successful implementation of the *Food and Nutrition Policy for Nova Scotia Public Schools*

4.2.3 Community

- **Promote and support development of healthy eating policies within the wider community.** In a similar way as tobacco free sport venues, we need to engage youth and community organizations, recreation facilities, households, and workplaces in creating environments that promote and support healthy eating.
- **Encourage girls to engage in physical activities, particularly by parents, educators, and practitioners responsible for physical activity programming.** Boys in the study more regularly played outside than girls and participated in intramural school programs (in grade seven and eleven) more, while girls were more frequently involved in sedentary activities.
- **Encourage students to continue to participate in walking, jogging, and running.** These inexpensive and spontaneous activities were noted as their most popular activities. However, the physical activity data shows students are not participating to the extent required for health benefits (i.e. insufficient duration, intensity or frequency). Educational, recreation, and youth organizations should consider unique methods of incorporating the opportunity to walk/run into their activities for youth.
- **Design and retrofit built and natural environments to encourage more spontaneous and active modes of transportation and recreation.** Organized programs make a significant contribution to physical activity but it is unrealistic to expect them to solve the problem on their own.
- **Involve youth in providing input and leadership on type, timing, place and structure of physical activity opportunities.** The information in this study should be supplemented with qualitative discussions with youth to verify and expand upon the meaning of physical activity in their lives.
- **Provide out of school time physical activity opportunities, especially for adolescents.** Use the findings on constraints identified by students in this study to design and administer physical activity programs and opportunities. In particular, cost, too much school work, and no one to go with, were identified consistently by the students in junior and senior high. There are numerous municipal and community organizations that serve youth and they should be informed about the problem and encouraged to integrate more opportunities for physical activity into their programs and services.
- **Support strategies to improve consumption of nutrient-dense foods in place of high-energy, low-nutrient foods for Nova Scotia youth.** Continue to support the implementation of *Healthy Eating Nova Scotia* where children and youth live, learn, and play. Emphasis should be placed on increased consumption of fruits, vegetables, whole grains, and milk products.

- **Encourage and support strategies to influence current effects of peers on food choice behaviours.** This should shift the cultural norm towards greater acceptance of healthier food and beverages by youth.
- **Provide support for charitable and community organizations providing breakfast, lunch and snack programs for Nova Scotia youth.** These programs have become an important component of increasing access to food for many families.

4.2.4 Health Care

- **Health care professionals should be trained and expected to provide counselling and appropriate referrals to community resources on healthy eating and physical activity to children, youth and their parents.** Previous research in NS shows that counselling, when it is provided, is usually for overweight patients. It should also be used as a preventive measure to support population based initiatives to promote healthy eating and physical activity. A normal weight inactive person and a normal weight person who does not eat healthy are also at risk for poor growth and development and long term negative health outcomes.

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